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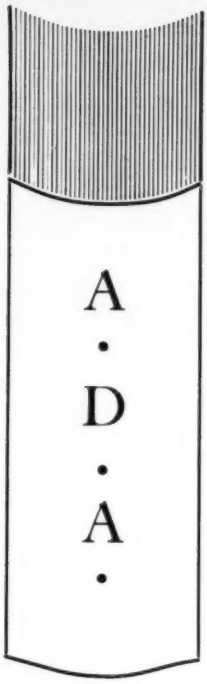

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ALGINATE IMPRESSION MATERIALS: TECHNIC FOR MANIPULATION AND CRITERIA FOR SELECTION

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In a previous publication[1] we reported an investigation of the dimensional stability of eight commercial alginate impression materials. Further research on these materials has been accomplished, and the purpose of the present paper is to present a logical technic for their manipulation and to outline criteria for selection on the basis of the research data to be presented. The materials investigated are listed in Table 1; two agar-base materials are included for purposes of comparison with the alginate materials. In an endeavor to be impartial, reference to these materials will be made by code letter or number, as given in the first column of Table 1.

Mixing Technic

The essential ingredients of an alginate impression material are a soluble alginate, a reactor such as calcium sulfate and a retarder such as sodium phosphate. During mixing, the alginate and the retarder go into solution. The retarder reacts with the calcium sulfate as the latter ionizes in solution, to produce an insoluble salt. When the retarder is used up, the calcium sulfate reacts with the alginate to form an insoluble calcium alginate gel. The last reaction must take place in the patient's mouth, and the purpose of the retarder is to prevent the formation of the gel during the mixing, the preparation of the tray and the insertion of the filled tray into the mouth of the patient.

The gelation or setting time of the alginate impression material is, therefore, extremely important. It must not be so long as to cause undue discomfort to the patient; yet it must allow sufficient time for manipulation by the dentist. The gelation times of the eight materials investigated are presented in Table 2. All of the materials were manipulated according to the directions of the manufacturer. As can be noted from the table,

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1. Skinner, E. W., and Pomés, C. E., Dimensional Stability of Alginate Impression Materials. *J.A.D.A.* 33:1253 (October 1) 1946.

the setting times of all of the materials are adequate with the possible exception of material E. Certainly 9.5 minutes is unnecessarily lengthy.

The gelation times were determined in all cases by a method which is a modification of that specified in the American Dental Association Specification No. 11 for the agar-base hydrocolloid impression materials. A brass tube of 10 mm. bore and a wall thickness of 1 mm. was pressed into the mixed material. The time which elapsed from the beginning of spatulation until a sharp impression of the tube was retained in the material was designated as the gelation time. It was observed that the gelation time obtained in this test corresponded to all practical purposes with the time that elapsed from the beginning of spatulation until the material lost its tackiness when it was touched with the finger.

Both the water and the powder to be used should be measured carefully according to the directions of the manufacturer. A measuring cup generally is provided for the proper amount of water to be mixed with one unit of powder sufficient for an impression. These proportions must not be measured by guess; although different proportions than those specified may not appear to affect the setting time of the material, the strength of the final impression may be decreased considerably if the water-powder ratio is not correct. As will be emphasized repeatedly, strength is an important property to be strived for throughout the technic of manipulation.

The temperature of the water may affect greatly the gelation time, as can be noted by the results shown in Table 3. The higher the temperature of the water, the faster the material sets. Generally, a water temperature of approximately 70 F. (21 C.) is specified by the manufacturer. According to Table 3, the temperature cannot vary more than 5 F. (3 C.) from this temperature without affecting the setting time noticeably. It is probably true for most alginate impression materials that the temperature of the water may be between 65 F. (18 C.) and 75 F. (24 C.) without affecting the setting time appreciably. However, any deviation in water temperature (or the temperature of the bowl and the alginate powder) beyond these limits will increase or decrease the gelation time, depending on whether the temperature is higher or lower, respectively, than the limits specified. Here again, of course, the manufacturer's directions are the final criteria. If it is found necessary to change the setting

Table 1.—Hydrocolloid impression materials investigated

Code letter	Name of product	Manufacturer
Alginate:		
A	Reprolastic Powder	Reliance Dental Manufacturing Co.
B	Lang Elastic Impression Material	Lang Dental Manufacturing Co.
C	Coe-Loid Powder	Coe Laboratories, Inc.
D	Zelex	The L. D. Caulk Co.
E	Opaloid Elastic Impression Powder	The Opalex Co.
F	D-P Three-in-One Cream	Dental Perfection Co.
G	D-P Elastic Impression Cream	Dental Perfection Co.
H	Fink Precision Impression Powder	Plastodent, Inc.
Agar-Agar:		
1	De Trey's Dentocoll	The L. D. Caulk Co.
2	S. S. White Elastic Colloid	The S. S. White Dental Mfg. Co.

Table 2.—Gelation time of alginate impression materials

Material	Gelation time, in minutes
A	5.0
B	6.0
C	5.0
D	4.0
E	9.5
F	5.0
G	4.0
H	3.5

time in dental practice, this can best be accomplished by changing the temperature of the water.

The influence of the spatulation time on the gelation time of a typical alginate impression material is not of importance, as proved by the data in Table 4. However, the effect on the strength of the set impression is considerable. For example, when a mixture with material C was spatulated for fifteen seconds, the compressive strength of the set material was 2,300 gm./cm.^{2} in contrast to 3,200 gm./cm.^{2} with a spatulation time of ninety seconds as specified by the manufacturer of this product. Insufficient spatulation results in failure of the ingredients to dissolve sufficiently. Over-spatulation gives equally poor results, since any calcium alginate gel formed during prolonged spatulation will be broken up and the strength will be impaired. The spatulation time must be noted with a timepiece and must not be estimated by the appearance of the mix. This factor undoubtedly has been the cause of many failures in impression taking with alginate materials. For the proper spatulation time to be employed, the manufacturer's directions should be consulted.

The actual method of spatulation should be somewhat more vigorous than that employed with plaster of Paris or hydrocal. The first ten to twenty seconds will be employed in incorporating the powder into the water, with a slower rotation of the plaster spatula than can be used later. As soon as the powder is wet, the spatulation speed should be increased to approximately 200 strokes per minute, applied vigorously. Mechanical spatulation offers certain advantages over hand spatulation in that the spatulation time can be reduced because of the increase in mixing speed. Needless to say, the plaster bowl, spatula and any other equipment that the material may come in contact with must be spotlessly clean. Since all gypsum products are almost pure calcium sulfate, any set plaster or stone which may cling to the bowl or other utensils will particularly affect the properties of the impression.

Preparation for Impression

A sturdy, perforated tray is essential to an accurate impression; a solid-walled type of tray with proper retentions is preferable, although the usual perforated tray may be used. All hydrocolloid impression materials are so flexible after gelation that any lack of rigidity of the impression tray will result in a distortion.

If a high vault is present, it may be necessary to build up the palatal portion

Table 3.—Effect of temperature of water on gelation time (material C)

Water temperature (C.)	Water temperature (F.)	Gelation time, in minutes
6	43	7.75
10	50	6.25
15	59	5.50
20	68	4.50
25	77	4.00
30	86	3.50
35	95	2.75
40	104	2.50
45	113	2.00
50	122	1.75

Table 4.—Effect of spatulation time on gelation time (material C)

Spatulation time, in minutes	Gelation time, in minutes
0.25	6.00
0.75	5.50
1.25	5.50
1.75	5.00
2.25	5.00
2.75	5.00
3.25	4.75
3.75	4.75
4.25	5.00
4.75	5.50
5.25	6.00
5.75	Fractured

of the tray with wax or compound. If this method is used, the wax should be stippled with holes to provide retention of the impression material. Hydrocolloid impression materials (either agar-base or alginate) generally exhibit little or no adhesion to any type of surface, and mechanical retention of some sort must be employed.

Theoretically, the impression in hydrocolloid materials should be of equal thickness of material throughout. If a large bulk of material is present in any portion, such as the vault area, compressive stresses will be introduced during the taking of the impression, and they will be relieved when the impression is removed; consequently, the vault portion will be "high." It is for this reason that the tray form may need to be adjusted with wax as described. When the patient is edentulous, a preliminary impression can be obtained in compound; the surface of this impression is then roughened in order to provide retention, and the hydrocolloid impression material is employed in a manner similar to that used with the "plaster wash" technic. These suggestions apply to the use of either an agar-base or an alginate impression material.

The alginate material is poured into the tray and is smoothed with a wet finger with some pressure in order to press the mixture into the retentions so that a mechanical locking will be assured. The best method of assuring retention is to coat the retentions with the material by pressing it into place with the wet finger and then to fill the tray completely.

The filled tray is carried to the mouth of the patient in the usual manner and pressed against the parts to be impressed with a steady, light, but firm pressure.

Obtaining the Impression

The impression should be held rigidly in position until after the alginate sets. Since the mouth tissues are at a higher temperature than that of the tray, the alginate material will start to gel first in the region adjacent to the tissues. Any movement of the tray at this time will result in a distortion of the impression. As little pressure as possible should be exerted on the tray during the gelation period, in order to reduce the subsequent distortion caused by compressive strains, as previously described. There is no need for pressure on the tray, since little or no tissue displacement can be expected with a hydrocolloid impression, owing to the physical nature of the material.

The completion of gelation can be observed by touching the residue in the plaster bowl. When this residue has lost its tackiness or stickiness, the alginate has set. The impression must then be allowed to remain in the mouth for two to three minutes beyond this period in order to obtain its maximum strength and rigidity. The importance of this slight delay in the removal of the impression is evidenced by the data presented in Tables 5 and 6.

All measurements of stress and strain were made on cylinders of material 0.5 inch (12.7 mm.) in diameter and 0.75 inch (19 mm.) in altitude. The data

presented in Table 5 were obtained from six specimens prepared at one time and stored in a relative humidity of 100 per cent until the tests were made every four minutes from (and including) the time of gelation. An arbitrary initial load (730 gm./cm.^{2} for material C and 1,920 gm./cm.^{2} for material G) was applied to each specimen, and thereafter the specimens were loaded at the rate of 210 gm./cm.^{2} per second until fracture occurred.

The specimens used to obtain the data in Table 6 were constructed and stored as for the compressive strength tests. A calculated load of 27.6 gm./cm.^{2} was applied, and a fiducial linear strain reading was obtained thirty seconds later. A calculated load of 400 gm./cm.^{2} was then applied for one minute. The specimen was allowed to recover free of any load for two minutes, the load of 27.6 gm./cm.^{2} was reapplied and a second linear strain reading was obtained. The difference between the two strain readings, expressed in percentage of the original altitude of the cylinder, was defined as the permanent deformation or "set." Since values could not be obtained in less than four minute intervals, it was necessary to measure two series of six specimens each in order to obtain values at two minute intervals as presented in Table 6.

All data in Tables 5 and 6 were obtained at 37 C. (99 F.), and they are the average of at least two trials in each case.

The results in Table 5 show the increase in strength with time that occurs in the alginate impression material, beginning with the time of gelation. A large increase in strength occurs between the gelation time and four minutes later. For all practical purposes, any change in strength beyond four minutes probably is not of practical importance.

The data in Table 6 are closely related to those in Table 5, since the amount of permanent set after stress is related both to the strength of the material and to the time of gelation. Not only must the impression be strong enough not to fracture on withdrawal, but also it must be sufficiently rigid and possess the proper elasticity to return closely to its original shape after it has been withdrawn over undercuts. Consequently, the lower the amount of the permanent set values shown in Table 6, the more satisfactory is the material. As stated previously, the impression must be kept in the mouth until this increase in strength and decrease in set has occurred. Consequently, in addition to possessing good properties in these respects, these properties must be attained within a period after gelation that will not cause undue discomfort to the patient.

According to the technic of impression taking already presented, the filled impression tray must be in the mouth before the time of gelation. If it is assumed that the tray is in place in the mouth one minute before the gelation time, the total time required in the mouth to obtain impressions with each material can be estimated by adding one minute to the difference between the gelation time and the time that a small permanent set occurred. For example, the total time that the impression must remain in the mouth in the case of materials A and B is seven minutes; for materials D and H, five minutes, and

Table 5.—Increase in compressive strength of alginate impression material from the time of gelation

Time from gelation, in minutes	Compressive strength (gm./cm.^{2})	
	Material C	Material G
0	1,560	3,440
4	3,105	7,800
8	3,420	8,260
12	3,230	7,160
16	3,480	7,510
20	3,320	6,210

for materials C, E, F and G, three minutes. It is noteworthy that material G possesses approximately the same strength (Table 5) and permanent set (Table 6) at its gelation time as do the best of the remaining materials two to four minutes later.

When the impression is removed, the "seal" should be broken as much as possible by moving the tray slightly in a lateral direction; the impression is then removed suddenly by jerking it downward or upward as the case may be. Any type of gel exhibits greater strength and less permanent set when it is deformed suddenly. If the hydrocolloid impression is removed slowly, a noticeable distortion or fracture may result.

Use of Fixing Solution

In a previous paper[1] it was stated that the purposes of the fixing solution were to stabilize the impression and to produce a hard surface on the cast. The first purpose was verified in the previous paper; the second was proved in the present research.

Extensive experiments were performed in connection with the measurement of surface hardness with the Brinell hardness tester, but contradictory results were obtained which are being studied further at the present time. The best test found so far for determining whether the surface of the cast material was affected by the alginate material was to construct casts from alginate impressions and examine the surface visually and tactually. If some of the gypsum material appeared on the impression after its removal and if the surface of the cast appeared "chalky" so that "powder" could be rubbed off with the finger, the surface obviously was damaged and the accuracy of the cast was impaired.

All materials were manipulated according to the directions of the manufacturers. The impression was removed from the cast thirty minutes after the cast was poured. Observations were made immediately.

Whenever a hydrocal-base gypsum material was used (Castone, Coe-cal, Diestone, Kerr Rapid Stone, Speedrock), the surface of the cast was "chalky" whenever it was allowed to set against an impression with material C if the impression had not been allowed to remain in the fixing solution for ten minutes. If the impressions were "fixed" for ten minutes before the cast was poured, the hardness and texture of the surface was the same as that obtained when the gypsum material was poured against a glass surface. The same phenomena were observed when pure hydrocal was used.

Casts were made in a similar manner with one of the hydrocal-base materials (Coe-cal) and all of the alginate impression materials listed in Table 1. If

Table 6.—Permanent deformation or "set" after stress

Time from gelation, in minutes	Deformation after stress*							
	A	B	C	D	E	F	G	H
0	17.2	18.0	7.0	7.9	9.8	6.9	4.1	17.4
2	10.0	13.6	4.7	6.3	4.3	3.9	4.9	11.4
4	7.9	8.6	3.2	4.1	4.7	3.5	3.5	5.6
6	6.2	5.9	3.2	.....	3.5	2.1	3.7	5.3
8	7.0	6.0	3.7	4.8	3.9	3.2	2.8	4.0
12	5.5	5.7	2.4	3.5	.....	2.7	3.0	3.7
16	5.3	4.5	2.5	3.2	.....	2.4	2.7	2.8
20	5.9	4.0	2.1	2.9	.....	1.6	1.8	2.7

*Difference between two strain readings, expressed in percentage of the original altitude of the cylinder.

a fixing bath was employed, the surface was adequate in all cases, but when a fixing bath was not employed (as in the case of materials A and B for which no fixing wafers were supplied by the manufacturer), a "chalky" surface on the cast resulted, with the exception of materials F and G; in the case of these materials, no fixing bath was necessary in any case.

When a model plaster was used as the cast material (Kerr Snow White No. 1), the surface of the cast was as firm and smooth as a control poured against glass, whether or not a "fixer" was used with material C. The reasons that the impressions did not require a soaking in the fixing bath for the model plaster is not clear, and we are working on this point at the present time. We suspect that the hydrogen ion concentration at the interface between the impression and the cast material will be the answer to the seemingly contradictory findings.

Accuracy of Reproduction

The ultimate and most practical criterion for judging an impression material is the accuracy with which it reproduces the original model. The use of a practical dental case was not employed but rather a metal model which represented the average undercuts found in practice. After many types of models for this purpose were considered, the model shown in Figure 1, used by Coe Laboratories, Inc., for studies of this sort, was selected.

The model in Figure 1 consists of a metallic cylinder, 5 cm. in diameter and 2 cm. in height. Posts of different shapes, approximately 1 cm. in diameter and height, are set in the top surface of the cylinder in pairs at opposite diameters. All of the posts present flat, parallel faces so that the distances (5 cm.) between these surfaces on opposite posts can be measured accurately, both on the original model and on a cast reproducing the model. The pairs of posts will be designated hereafter as I, II and III; posts I are the posts at the extreme right and left in Figure 1; posts II are at the right front and left back, and posts III, left front and right back. Posts I present the greatest undercut. Table 7 presents the percentage accuracy of reproduction with the alginate materials and two agar-base materials when the impression was removed at gelation and two minutes later.

Fig. 1.—Model employed for the determination of the accuracy of reproduction of hydrocolloid impression materials

The greatest undercut on the outside surface of posts I is 16 per cent, and on the inside it is 22 per cent. There are no undercuts on the inside surface of the other posts; the undercuts on the outside surface of posts II are 16 per cent and posts III, 20 per cent. All tests and measurements were made with the temperature of the model at 37 C. (99 F.).

After the impression was obtained, it was treated in a fixing bath, if such treatment was specified by the manufacturer. The stone cast was poured immediately after the impression was ready, in order to avoid a dimensional change. The impression was removed from the cast after thirty minutes, and the measurements on the cast were made twenty-four hours later. The results shown in Table 7 are the average of three

trials, expressed in percentage of the distance between the post surfaces on the original model, after the measurements on the cast were corrected for the setting expansion of the hydrocal-base stone employed. A plus value indicates that the impression was larger than the model in the indicated dimension, and a minus value indicates a contraction in a similar manner. The general accuracy of the measurements was within 0.01 mm.

According to Table 7, all of the materials produced more accurate impressions when they were allowed to remain in contact with the model for two minutes after gelation than when they were removed at the time of gelation, with the exception of material F and possibly C, both of which produced reasonably accurate impressions even though they were removed at the time of gelation. These data are, then, further corroboration of the fact that the impression should not be removed from the mouth at the time of gelation.

Comparison of the accuracy of the alginate impressions which were allowed to remain in contact with the model for two minutes with those obtained with the agar-base materials shows that some of the alginate materials compare very favorably with the agar-base materials. For example, the accuracy of the impressions made with materials C, F and G compare very favorably with the values obtained for the agar-base materials. Material D possibly may be included also, since the error incurred with post I probably is not significantly higher than the others, particularly in consideration of the small errors incurred on posts II and III. Data of this nature should dispel rumors to the effect that impressions with alginate materials are less accurate than those obtained with agar-base materials, provided a good alginate material is used and it is manipulated properly.

Criteria of Selection

Any agar-base hyrocolloid impression material which meets the American Dental Association Specification No. 11 for hydrocolloid impression materials is satisfactory. The criterion of selection for this type of impression material is, then, quite simple—if the manufacturer guarantees his material to meet this specification, it is almost certain that the dentist can use it with success. At present no American Dental Association specification exists for the alginate materials, and the criteria of selection are more difficult. Undoubt-

Table 7.—Accuracy of reproduction by a hydrocolloid impression of a metal model (Fig. 1)

Time from gelation, in minutes	Accuracy of reproduction*									
	A	B	C	D	E	F	G	H	Agar-Agar 1	Agar-Agar 2
Posts I:										
0	−0.18	−0.68	−0.10	−0.63	−0.15	−0.00	−0.25	−0.64	+0.06	+0.06
2	−0.16	−0.45	−0.02	−0.13	−0.13	+0.03	−0.04	−0.68		
Posts II:										
0	−0.12	−0.56	−0.03	−0.34	−0.09	−0.03	−0.19	−0.12	+0.09	+0.08
2	−0.16	−0.37	+0.06	−0.08	−0.16	+0.03	+0.01	−0.16		
Posts III:										
0	−0.07	−0.47	−0.07	−0.24	−0.09	−0.03	−0.15	−0.28	+0.06	+0.05
2	−0.16	−0.35	−0.06	−0.08	−0.09	+0.03	+0.01	−0.27		

*Expressed in percentage of the distance between the post surfaces on the original model.

edly the Research Commission of the American Dental Association will provide a specification for these materials in the near future.

The alginate impression materials studied were subjected to the compression tests outlined for the agar-base materials in the American Dental Association Specification No. 11.[2] The results are shown in Table 8. The two agar-base materials are included for comparison.

Inasmuch as the specification has operated successfully for the agar-base materials, it would seem that the values specified for the agar-base materials for strain in compression (4.0 to 20.0 per cent) and compressive strength (minimum, 2,000 gm./cm.^{2}) might be retained along with the same test methods as for the alginate materials. Two of the alginate materials (F and G) meet the specification for the agar-base materials in every respect. However, all of the alginate materials exhibit a higher "set" than do the agar-base materials 1 and 2. Nevertheless, the accuracy of reproduction of the better alginate materials is the same as that of the agar-base materials, according to Table 7. Consequently, there is justification on the basis of the data in both Tables 7 and 8 to raise the maximum value of the "set" from 3 per cent to 5 per cent.

On the basis of the data in Table 2 and a general consideration of the dental requirements, a setting or gelation time of three to six minutes for the alginate materials might be substituted for the gelation temperature requirement for the agar-base materials. If these changes are granted, a possible specification for alginate impression material results, so far as "Detail Requirements" are concerned. Materials C, D, F and G meet these requirements throughout, on the basis of the data presented.

Composition

As previously stated, the typical alginate impression materials contain calcium sulfate, sodium phosphate, a soluble alginate (for example, potassium alginate) and a filler. The filler can be an insoluble carbonate, diatomaceous earth, powdered wax or similar types of ingredients.

2. Paffenbarger, G. C., Hydrocolloidal Impression Materials. *J.A.D.A.* 27:373 (March) 1940.

Table 8.—Compressive properties (tested according to A.D.A. Specification No. 11)

Material	Strain (per cent)	Set (per cent)	Strength (gm./cm.^{2})
Alginate:			
A	23.0	6.1	1,600
B	23.0	7.7	1,600
C	15.6	3.4	3,200
D	18.2	4.4	3,700
E	21.0	4.8	1,500
F	9.3	1.9	10,267
G	10.1	2.6	8,533
H	15.1	4.1	1,600
Agar-Agar:			
1	4.2	0.4	2,800
2	3.2	0.4	2,700
Specification	4.0 to 20.0	Maximum: 3.0	Minimum: 2,000

Fig. 2.—Typodont with removable bridge, precision attachments. (Courtesy of Protesis)

Materials F and G appear to possess certain properties which are not typical of the other materials. For example, they exhibit greater strength and less "set" (Table 3) than do any of the other alginate materials. The fact that the materials were stronger led us to suspect that some other (or additional) insoluble alginate gel than calcium alginate was formed during the gelation. Consequently, a qualitative chemical analysis was made for metallic ions. Lead was found in both materials. A quantitative analysis by D. A. Wallace and J. R. Doty at the Bureau of Chemistry of the American Dental Association showed that lead was present in material F to the extent of 23.9 per cent, calculated as lead oxide (PbO), and 74.8 per cent in the powder supplied with material G. The chemical combination in which the lead occurs was not determined, but very likely a lead alginate gel is formed during the setting of the material as a substitute for, or in addition to, calcium alginate. Consequently, the impression is made stronger and more rigid.

Pouring the Cast

The cast should be constructed immediately after the impression is removed from the fixing bath, for reasons stated in the previous paper.[1] The impression should be boxed with care so as not to cause distortion. Since the material is so flexible, it will move with the slightest pressure. The stone is poured as usual, although excessive vibration should be avoided.

Under no circumstances should the impression be filled with the stone mix and then inverted onto a pile of stone, as is so often practiced with other types of impression materials. Such a procedure is bound to distort the impression when it is forced against the stone mix to form the base of the cast.

A possible method for constructing the cast is shown in Figures 2 to 5, inclusive.[3] Figure 2 shows a typodont prepared for a bridge with precision attachments. The pontic was removed, with the retainers left in place in the typodont. An impression was obtained with an alginate material, as shown in Figure 3. The retainers are placed in position and the impression is filled with stone, as shown in

3. Pomés, C. E., Hidrocoloides. *Protesis* 51:373 (December) 1945.

Fig. 3.—Alginate impression with retainers in place. (Courtesy of Protesis)

Fig. 4.—Impression filled with stone. (Courtesy of Protesis)

Figure 4. This part of the cast is allowed to set; then another mix of stone is placed on a glass plate and the filled impression is pressed into it, so as to join the part already set with the base portion so formed. The cast is trimmed as usual. The finished cast is shown in Figure 5, with the pontic and precision attachments in place. The figures provide further evidence for the accuracy of the alginate impression materials.

Clinical Significance and Summary

Eight alginate impression materials were tested for setting time under various conditions of manipulation, compressive properties and accuracy of reproduction. On the basis of the data presented, a logical technic for manipulation of the materials was outlined.

In consideration of the data obtained, a possible specification was suggested, which was met by four of the materials (C, D, F and G). However, the data presented can apply only to the batches of materials tested by us. On a conservative estimate, eighteen months will elapse between the time that the data were obtained and the time that this paper will appear in print. During this period, some of the manufacturers may improve their products, and it is conceivable that others temporarily may lose control of their production. The manufacturing of an alginate impression material is a difficult matter, and the manufacturer must be constantly on the alert, if his production is held to the same quality at all times. For these reasons, we cannot claim that the results presented in this paper necessarily represent the conditions or quality of the materials at the time this paper is published. However, at the time the research was in progress, we are certain that the four materials mentioned previously were the best available, with little choice between them. This conclusion is based mainly on the data presented in Tables 6 and 7.

The directions of the manufacturer are the fundamental guides for the manipulation of the materials, and they should be read carefully before any of the materials is used. The following general instructions are summarized from the research:

Fig. 5.—Stone cast with the bridge in place. (Courtesy of Protesis)

1. The water and powder must be proportioned accurately.

2. The temperature of the water used should be between 65 F. and 75 F.

3. The mix must be spatulated vigorously for the exact time specified by the manufacturer.

4. The impression must be retained in the mouth of the patient for two to three minutes after the gelation of the material; gelation is evidenced by a loss of tackiness when the material is touched with the finger.

5. The impression must be removed from the mouth tissues suddenly.

6. The impression must be allowed to remain in the fixing bath for a period of at least ten minutes.

7. Care must be taken to prevent distortion of the impression when the cast is poured. A method for pouring the cast was prescribed. The impression must not be exposed to air or water longer than is absolutely necessary before the cast is poured.

It was proved that the accuracy of the impression, when a good alginate material was employed and when it was manipulated properly, was equal to that obtained with agar-base hydrocolloid materials. In fact, the accuracy was in the range of that of an inlay cast by any high-heat technic.—*311 East Chicago Avenue.*

GOTHIC ARCH TRACING AND TEMPOROMANDIBULAR ANATOMY

H. Aprile,* M.D., D.D.S., and P. Saizar, D.D.S., Buenos Aires, Argentina

WHILE investigating the anatomic relations of full dentures, we noticed the ease with which it was possible, on the cadaver, to register centric relation by the Gothic arch or arrow point tracings. To obtain these tracings we had only to place the registering device in position, grip the mandible by the chin and move it in all horizontal directions, while keeping the pin or bearing point in contact with the tracing table. Figure 1 shows the tracing obtained by manipulations of one head. Figure 2 shows that of another. In both cases the heads had retained their suppleness by preservation in glycerin and formaldehyde.

The ease with which we obtained such clear records led us to believe that the Gothic arch tracing depends solely on the mechanical possibilities of movement, governed by the structure and relations of bones and ligaments. In other words, it is the anatomic conformation of the temporomandibular articulations, and not the position of the muscles that move them, which determines the placement of the points around which the mandible rotates.

In an attempt to prove this hypothesis we undertook two experiments, which could be called dismantling and reconstruction of the temporomandibular articulations.

Dismantling

Impressions were obtained of both edentulous jaws of a head, and on their corresponding models central bearing

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Fig. 1.—Gothic arch tracing from head preserved in glycerin and formaldehyde

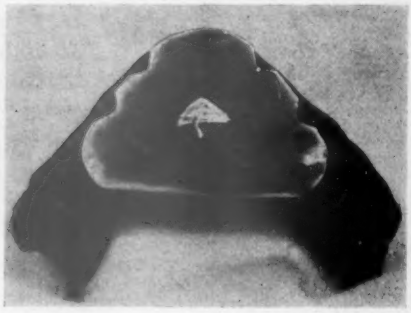

Fig. 2.—Tracing from badly preserved head in which putrefaction was beginning

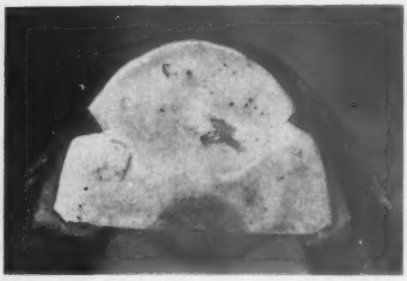

Fig. 3.—Tracing from head preserved in formaldehyde

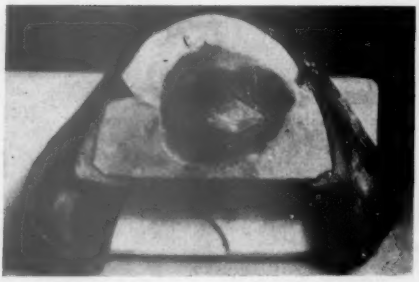

Fig. 4.—Appearance of tracing after soft tissues were sectioned

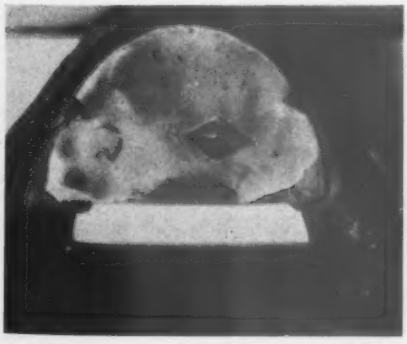

Fig. 5.—Tracing produced after sphenomandibular, stylomandibular and pterygomandibular ligaments were eliminated

Fig. 6.—Appearance of tracing after external lateral ligament was sectioned on one side is shown

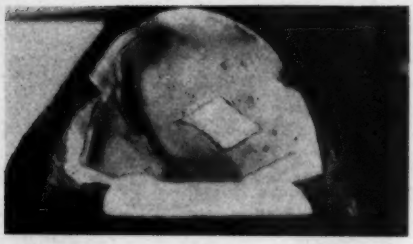

Fig. 7.—Tracing produced after external and internal ligaments were cut on both sides

Fig. 9.—Tracing after both meniscuses were eliminated

bite plates were prepared after Phillip's technic, with the pin on the upper jaw and the tracing table on the lower. With the instrument in the mouth of the cadaver, it was difficult to produce extensive movements as the head was rigid owing to its having been preserved in formaldehyde only. However, a clear Gothic arch tracing was obtained, although with short sides (Fig. 3).

We next removed the cheeks and all external soft tissues, leaving the temporomandibular articulations and their accessory ligaments (sphenomaxillary, stylomaxillary and pterygomaxillary) carefully dissected. A new recording of the horizontal mandibular movements was found easy to produce (Fig. 4), proving that: (a) the apex of the Gothic arch tracing occupied the same position as in the previous registration; (b) the arms of the Gothic arch were longer, retaining their neatness, and (c) not only the Gothic arch was traced, but also the complete rhombus that the edentulous patient can record when perfect liberty of movement exists. This rhombus was no different, apparently, from that repeatedly obtained in patients. These findings confirmed our belief that neither the soft tissues nor habits determine production of this rhombus.

Fig. 8.—Appearance of tracing after periarticular capsules were cut

After we had cut the accessory ligaments a new registration proved to be practically identical to the previous one (Fig. 5). This showed that the accessory ligaments do not influence the lateral movements of the mandible and constitutes another argument in corroboration of those who contend that these ligaments are not really part of the articulation.

After having sectioned the external lateral ligament on one side we had the following results (Fig. 6): (a) The apex of the Gothic arch preserved its position; (b) the outline of the tracing remained clear; (c) two sides of the rhombus retained their dimensions, and (d) the other two were lengthened. This seems to demonstrate that the external lateral ligament does not influence the shape of the Gothic arch and that it restrains the anterior displacement of the condyle.

The internal lateral ligaments were cut, but it was impossible not to destroy some of the superficial fibers of the capsular ligaments. The result (Fig. 7) was a fur-

ther enlargement and some deformation of the rhombus, although it retained its essential geometric characteristics.

Then we cut the periarticular capsules in their entirety and it was evidenced (Fig. 8) that: (a) The Gothic arch and even the rhombus tracings were obtained, although less neatly; (b) the apex of the Gothic arch was farther forward, which meant that the condyles traveled farther backward, and (c) the rhombus increased considerably in size. Therefore, it appears that the periarticular capsule exerts little or no influence on the rhombic design of the horizontal mandibular movements, but that it limits the condylar displacements, especially posteriorly.

Upon elimination of the interarticular fibrocartilages the movements were more ample (Fig. 9) and, to our surprise, retained their rhombic tracing. The mandible, at this stage, was joined to the cranium solely by the soft tissues of the floor of the mouth and the lateral walls of the pharynx.

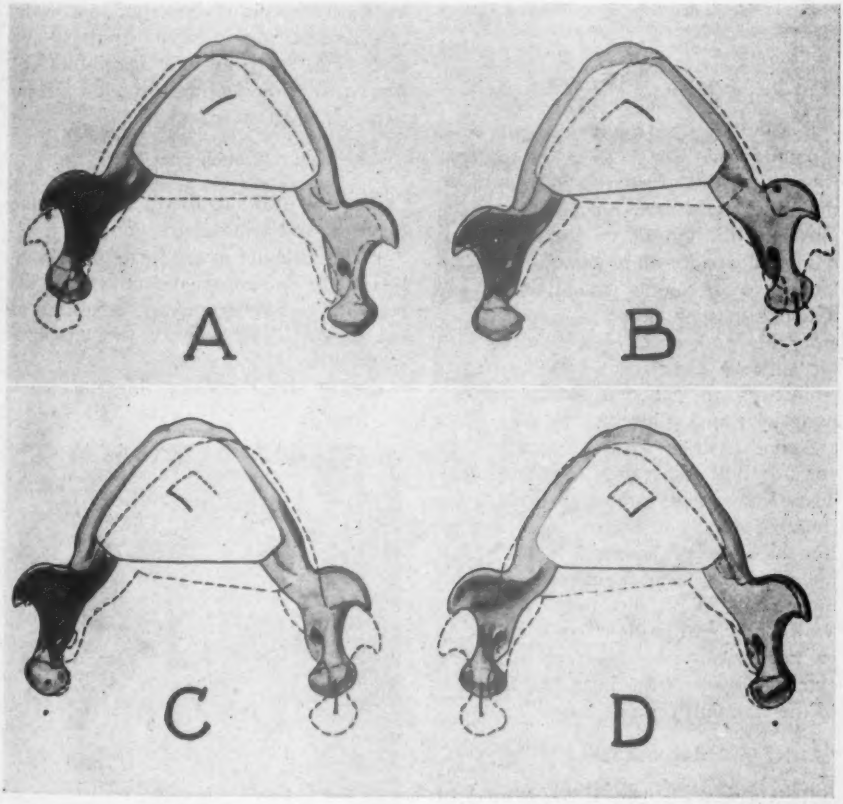

Fig. 10.—A, tracing produced on tracing plate on lower jaw when right condyle rotates in glenoid cavity and left condyle slides forward, downward and inward. B, left condyle rotates and right condyle slides, completing Gothic arch tracing. C, left condyle rotates on eminentia articularis and right condyle slides, beginning drawing of rhombus. D, right condyle rotates in its most propulsive position and left condyle slides, completing rhombus

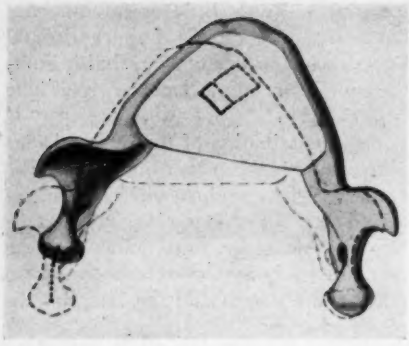

Fig. 11.—Changed shape of tracing, which becomes longer to side of greater slant, if one condyle has greater forward slant, resulting from cutting of one lateral external ligament

Finally, the tracing ceased to be a rhombus when the necks of the condyles were cut. This proves, in our opinion, that the horizontal movements which produce the rhombic tracing result fundamentally from the structure and relations of the bony formations of the temporomandibular articulations. Apparently the condyles, in their relations with the glenoid cavities and the articular eminences, are only free to slide anteroposteriorly and rotate slightly: when only one condyle slides, the other rotates (Fig. 10); or both may slide simultaneously. These movements suffice to explain the rhombic tracing in Figure 10, C and D. But the ligaments, capsular ligament and interarticular fibrocartilages limit these movements in all directions. Figure 11 shows how, when one condyle has a greater forward sweep because the lateral external ligament has been cut, the sides of the rhombus become longer.

Reconstruction

This second experiment constituted the counterproof. The mechanical elements of the temporomandibular articulations were reconstructed on a skull. Pieces of chamois attached to the condyles represented the interarticular fibrocartilage; the capsular ligaments were simulated with fingers of rubber gloves, adhered to the neck of the condyles and periphery of the glenoid cavities; and external and internal lateral ligaments were imitated with pieces of rubber fastened to the corresponding places. Bite plates were constructed with an upper pin and lower table in order to determine the vertical dimension. Figure 12 shows this preparation in function, open. Figure 13 gives a lateral view.

Under these conditions it was gratifying to see the pin trace a rhombus on the table, practically normal in shape and size (Fig. 14), as the mandible was moved in all horizontal directions (compare with Figs. 1, 2 and 4).

Conclusions

We feel justified, therefore, in setting forth the following conclusions:

1. The tracing in the form of a rhombus of the horizontal movements of the mandible results from the disposition of the osseous formations of the temporomandibular articulations.

2. The interarticular fibrocartilages,

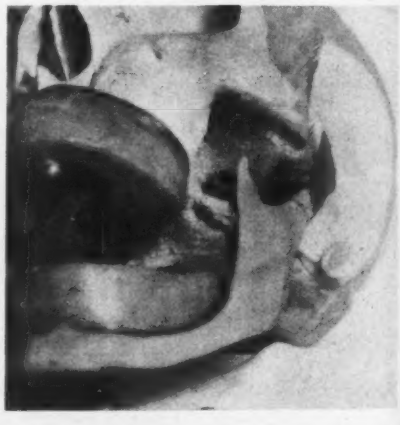

Fig. 12.—Reconstructed temporomandibular joints in open position

Fig. 13.—Lateral view of head with device in position

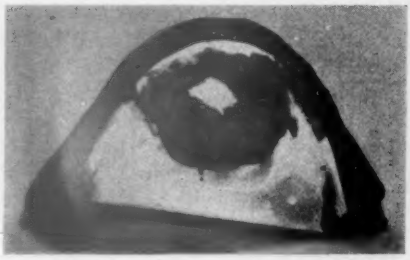

Fig. 14.—Appearance of tracing from reconstructed head

capsular ligaments and internal and external lateral ligaments limit the extension of these movements and determine the length of the sides of the rhombus.

3. The so-called accessory ligaments do not appear to have any influence on the tracing of the Gothic arch.

4. The muscles and other soft tissues appear to have no influence on the tracing.

5. Severe alterations may occur in the temporomandibular articulations without interfering with the patient's ability to trace a perfect Gothic arch or rhombus.—*Arenales 1635.*

PRACTICAL APPLICATION OF FACTORS GOVERNING OCCLUSAL BALANCE OF ARTIFICIAL DENTURES

Arthur L. Roberts, D.D.S., Aurora, Ill.

ARTIFICIAL dentures are constructed for several major reasons: (1) as a means of improving facial appearance; (2) as an aid in speech, and (3) as a mechanism to help in preparing food for swallowing.

To be satisfactory, these appliances should be good-looking, comfortable and effective. Another specification, which is frequently overlooked, is that they be built in such a manner as to preserve the shape and health of the vital structures which support them. The biologic forces which induce atrophy of the alveolar ridges cannot be controlled, in the light of our present knowledge. The rate and amount of this resorption, however, can be minimized greatly by the application of mechanical principles which we do understand. Conversely, the rate of resorption can be accelerated powerfully if these known facts are ignored, with the result that many apparently successful restorations degenerate rapidly into loose, uncomfortable contraptions. The descriptive term "poor bony support" is used too often as an evasive reason for this type of failure.

Read at the eighty-second midwinter meeting of the Chicago Dental Society, Chicago, February 10-13, 1947.

In the field of mechanics it is easily noted that machines, which are placed correctly upon their supports and whose movements are balanced harmoniously, stay put and exert the least destructive force upon their bases. These evident mechanical principles are applicable to artificial dentures, which consist of working machines resting upon bases. Correct placement of the working surfaces with reference to the bones and muscles which support and move them is essential. The importance of a harmonious relationship of cuspal surfaces to each other, of course, cannot be minimized; but cuspal relationship is only a part of the whole picture. It is not sufficient to evaluate occlusal balance by observing only the relationship of occluding surfaces to each other. Placement of these surfaces, vertically and horizontally, with regard to the bases and to the structures of the head which govern jaw movement is equally important.

In the field of orthodontia, where occlusal balance is studied keenly there is an increasing appreciation of the effect of placement of the denture. The orthodontist of today does not plan his treatment by observation of tooth-to-tooth relationship only. In addition, he studies roentgenographic plates of the head and photographs of the patient in order to orient the dental mechanism to its base and musculature.

Occlusal Balance

In the field of denture prosthetics, occlusal balance cannot be accomplished or maintained by focusing the entire effort upon tooth-to-tooth relationship. A more complete concept must include the principles of denture placement.

The subject presents four aspects: (1) the vertical placement; (2) the occlusion to ridge placement; (3) the horizontal centric placement, and (4) tooth-to-tooth balance in all functional positions.

Accurate determination of the vertical denture space is one precept of denture prosthetics which has been, and still is, violated more frequently than any other; yet it is obtained easily. The error is the result of a mistaken belief, held by many dentists, that the facial appearance of the patient, as viewed with biterims in place, is the determining factor in establishing the vertical dimension. When the biterims are in place many dentists increase or decrease the height of these rims, in occlusion, until the patient's face "looks" to be the right length. This procedure is exceedingly inaccurate, and it is not generally realized how an error, particularly on the plus side, can be so disastrous. Impelled by a desire to make the lower third of the patient's face appear fifteen or twenty years younger than the rest of the body, many dentists open the bite with the idea that, by so doing, the facial wrinkles of the patient will be stretched out.

Thompson[1] has proved that if, by means of prosthetic restoration, the vertical dimension is increased beyond normal for a patient, biologic forces will return the mandible to its correct position by resorption of the alveolar ridges. Incorrect vertical dimension is the cause of more uncontrolled ridge resorption and more so-called settling out of balance of dentures than any other one error.

Two Vertical Dimensions

Actually, two vertical dimensions must be measured: (1) the distance between maxilla and mandible when the latter is at rest, and (2) the distance between them when artificial teeth or biterims are in occlusion. The occluding dimension is 3 to 5 mm. less than the rest position. The difference between the two is the highly important free way space.

The rest position is a constant one and is easily measured extra-orally. Niswon-

1. Thompson, J. R., Constancy of Position of the Mandible and Its Influence on Prosthetic Restorations. *Ill. D. J.* 12: (June) 1943.

ger,[2] in 1934, and Gillis,[3] in 1941, demonstrated that the position of the mandible at rest was determined by unchanging, reciprocal muscle action, that it was always the same in each person and did not change with the loss, in whole or in part, of the natural teeth.

Proof that the rest position of the mandible is a constant one is a major contribution to the art of restorative dentistry. After this position is measured, the vertical dimension of dentures is readily calculated. All that is necessary is to be certain that the occluding dimension is 3 to 5 mm. shorter than the easily measured rest position.

A quick, accurate way to measure the mandibular rest position is an adaptation of a method described by Niswonger in 1934 and by Schlosser[4] in 1941. Both of these investigators observed the constancy of the rest position.

Measuring Rest Position

The patient should be relaxed, either sitting or standing, with only the upper biterim in place. No headrest is used. With a moist, sharp indelible pencil, a very small dot is made on the end of the nose and another on the chin near the lower border. The patient is asked to swallow, then speak the letter M in a natural conversational tone. A second or so after the M sound is spoken, a relaxation of the lower jaw muscles will be noted. The points of a pair of dividers are placed on the dots on the patient's face and the dividers are locked, thus recording the distance from dot to dot when the mandible is in the rest position. The patient's attention is distracted for a minute or so by getting him to smile or talk, and the process is repeated in order to check the measurement. The divider points invariably will be found to rest on the dots (Fig. 1, left). Dentures for this patient must be constructed so that their vertical height in occlusion is less than the dimension of this rest position. Otherwise, there will be no free way space, and resorption will ensue immediately and will continue until adequate clearance is obtained.

Measuring Vertical Height

The correct vertical height of the dentures is determined as follows: The upper wax biterim is in place, and a roll of soft wax is added to the lower baseplate. This is placed in the patient's mouth and he is asked to "suck, then swallow quickly." The word "quickly" should be emphasized. The distance between the two dots is then measured with the dividers. In most cases, it will be found that the patient has closed the jaw at an occlusal level slightly lower than the rest position point. If so, this position is correct. If the jaws, however, are still too far apart, the wax should be resoftened and the "suck, then swallow quickly" procedure should be repeated until the position is correct. It is important that the patient be relaxed, sitting comfortably erect with no headrest support.

When correct vertical dimension has been determined, the biterims are luted together in the mouth, the face-bow is applied (Fig. 1, right), and the casts transferred to an articulator which should have, among other things, a means of securely recording the vertical dimension by a definite pin stop. At this time it is not necessary to determine horizontal centric relation accurately. This will be accomplished in a later step in the procedure.

The next element which governs occlusal balance in dentures is occlusion to ridge placement. Study of this factor must include consideration of the place-

2. Niswonger, M. E., Rest Position of the Mandible and Centric Relation. *J.A.D.A.* 21:1572 (September) 1934.

3. Gillis, R. R., Establishing Vertical Dimension in Full Denture Construction. *J.A.D.A.* 28:430 (March) 1941.

4. Schlosser, R. O., Methods of Securing Centric Relation and Other Positional Relation Records in Complete Denture Prosthesis. *J.A.D.A.* 28:17 (January) 1941.

Fig 1.—Left: Determination of rest position. Upper base only is in place. Patient swallows and pronounces letter M. Right: Application of face-bow before transfer of occlusal rims to articulator

ment of the working surfaces of the teeth with reference to the alveolar bases, and the horizontal relationship of these bases to each other. It must include consideration of the angle of the occlusal plane, the anteroposterior curves, if any, and the buccolingual tilt of the occluding surfaces.

The biterims are now removed from the casts which have been made and mounted, as described, in correct vertical relation on an articulator. It is now possible to visualize ridge relations and plan the placement of the teeth in such a manner as to obtain maximum denture balance (Fig. 2).

Occlusal Plane

For years, dentists have accepted a plane parallel to a line drawn from the ala of the nose to the tragus of the ear as a satisfactory anteroposterior occlusal plane. Although this assumption is proper in many instances, in a large number of cases it is not. Examination of lateral roentgenograms of the head or a mounting of casts on the articulator so that the horizontal articulator arms are parallel with the Frankfort plane on the face, as described by Mauk,[5] will demonstrate readily a great deviation in the angle of the plane. This fact would be much clearer to dentists if articulators were obtainable with sufficient vertical height to allow placement of the casts in the same relation to the horizontal articulator arm that the ridges bear to the Frankfort plane of the patient. If preextraction record casts were so mounted, attainment of a satisfactory esthetic result, also, would be simplified.

Although dentures can be made to balance at various angles of the occlusal plane, selection of an angle which fits the case at hand is essential.

Anteroposterior parallelism of the opposing ridges provides maximum stability. Ridges which have not been mutilated or deformed by disease or ill-fitting appliances usually present this parallelism at the correct vertical opening. This fact is a fairly good check on the accuracy of the vertical dimension as observed on the mounted casts. Parallelism, however, is

5. Mauk, E. H., Variations in the Occlusal Plane. *D. Survey* 22:2078 (November) 1946.

not always present. If it is lacking, the dentist must decide whether or not to shorten the vertical dimension slightly, even at the expense of esthetics, in order to secure a closer approach to parallelism. If this latter procedure is not feasible, the plane should be so placed that the occluding forces will provide maximum seating and minimum displacement of the weaker base, usually the lower.

An anteroposterior curve of the occlusal surfaces is present in well balanced natural teeth. Incorporated into artificial dentures, this curve, together with the buccolingual tilt of the posterior teeth, aids in producing balance by compensating for the dropping down of the condyle when lateral or protrusive movements are made. These factors, adapted to each individual case, can be determined by a technic described by Meyer[6] in 1935.

Anteroposterior Curve

The biterims which were used in mounting the casts in correct vertical relation are used in this step, also. The upper rim is adjusted in the incisal region in the mouth to an acceptable esthetic line for the anterior teeth. Posteriorly, the wax is molded to a tentative occlusal plane and curve which, in the operator's judgment, harmonizes with the various elements presented by the case at hand. Soft wax is added to the lower rim and, after interposing wet cellophane, this rim is pressed to fit the upper rim by closing the articulator. Accuracy of the esthetic result can be checked at this time by setting the twelve anterior teeth on another set of wax rims to the levels determined and trying them in the mouth. If satisfactory, these setup rims are laid aside, and the tentative wax occlusal rims are replaced in the mouth. By testing in various movements of the jaw, it will be seen readily whether or not the tentative plane and curve are approximately correct. If not, these should be modified until approximate balance in all movements is obtained. Balance need not be accurate at this time. The rims should be returned to the articulator frequently to be certain that the vertical dimension is not changed.

A second set of biterims is next made on the articulator, using hard compound instead of wax.[7] To obtain duplication, the lower compound rim is built against the upper wax rim and conversely. Each

6. Meyer, F. S., Balanced and Functional Occlusion in Relation to Denture Work. *J.A.D.A.* 22:1156 (July) 1935.

7. Central Nebraska Study Club, Complete Denture Service With Balanced Functional Occlusion. *J.A.D.A.* 30:366 (March 1) 1943.

Fig. 2.—Mounted casts with rims removed. Note parallelism of ridges

compound rim is then softened slightly with a blowpipe and reduced in height about 2 mm. by placing wet blotting paper between it and its opposing wax rim. Compound rims are thus obtained, each of which is about 2 mm. shorter than the wax rims but has the same occlusal character. With a pair of dividers, a horizontal line is marked on each compound rim to record the vertical dimension. The dividers are locked and laid aside for future use. Next, a 3 mm. layer of occlusal plane wax is added to each compound rim. This very soft wax is covered with a sheet of tin foil. On the articulator the vertical dimension is now approximately 2 mm. open, because, although 4 mm. was taken away from the compound, a total of 6 mm. of wax was added. The tin-foiled surfaces of the rims are lubricated with petrolatum and the rims are placed in the patient's mouth. The patient is asked to close and to rub the rims together by gliding movements of the mandible. This rubbing is continued until it is noted, on measuring the scratch marks with the dividers, that the accepted vertical opening has been reached again. Examination of the rims will disclose that the character of the anteroposterior curves and the buccolingual tilt of the wax occluding surfaces have been greatly modified. By milling the wax surfaces in this manner the patient records a transcript of the functional occluding path peculiar to him. Teeth which are set up according to this path are far easier to balance later, when the cusp-to-cusp relationship is developed. Knowledge of this path insures accuracy and saves considerable time.

Horizontal Centric Position

It is generally accepted that horizontal centric position exists when the condyle heads are in the most retruded position from which lateral movements may be made. The Gothic arch tracing is an infallible means of finding this position graphically. Clinical observation, however, shows that many patients wearing full dentures do not function most comfortably or efficiently in the most retruded position but choose a point which is protrusive or lateral to it. Muscle habits resulting from malocclusion, missing posterior teeth or faulty previous restorations are the most probable causes of this. If provided with dentures which allow them to do so, the jaws of most of these patients will return to a more normal centric position. If the aberration is not excessive, dentures which contain regular cusp teeth can be so constructed that this return to normal is possible. If, however, a great discrepancy exists, for instance, a lateral difference of 3 to 5 mm., treatment dentures should be built, using cuspless teeth.[8] Such a patient should be kept under observation until more normal jaw relation is established through function, at which time dentures employing posterior teeth with cusps should be substituted. It is important that the dentist know when he has encountered such a case, and it is easy to recognize at this time.

The milled biterims are thoroughly chilled, excess soft wax is trimmed off, and they are replaced in the patient's mouth. With the patient's head thrown well back, the most retrusive jaw relation in occlusion is noted by making vertical scratch marks with a sharp instrument from rim to rim. The patient is then asked to sit comfortably erect, in a similar position to that used when seated at dinner. He is asked to go through comfortable chewing motions, and the functional centric position is noted. A satisfactory functional centric position is one which coincides with the most retrusive position or is just slightly protrusive to it. A difference of over 3 mm., however, marks the patient as one who would do well under the cuspless tooth treatment formerly mentioned. Particularly is this

8. Boos, Ralph, Centric and Functional Bite Relations. *J.A.D.A.* 30:262 (February 1) 1943.

true if the difference is a lateral one. Most patients will demonstrate a centric position slightly protrusive to the most retruded mandibular position.

When the correct functional position has been determined, the rims are locked together with four-legged staples, chilled thoroughly and removed from the mouth. The lower cast is removed from the mounting plate of the articulator and remounted, the stapled rims being used for correct placement.

After the mounting plaster has set, the compound and wax are removed from the lower baseplate and artificial stone is substituted. This is done by making a dam of molding clay around the lower baseplate, adding a mix of stone and closing down upon it the upper arm of the articulator with the upper biterim attached. A relatively indestructible record of the lower occlusal path is thereby made.

Thus far, we have accomplished the following: Casts have been placed on the articulator to register correctly the vertical dimension and horizontal position. On the rims, a functional occlusal path has been developed which harmonizes with the movements of the patient's jaw.

Mounting the Teeth

The upper teeth are now set with reference to the lower stone biterim, in such a way that all cusps touch its surface. A guideline is drawn on the stone corresponding to the crest of the lower ridge, and the masticatory groove of the upper teeth follows this line (Fig. 3, left). This arrangement will place the buccal cusps of the lower teeth directly over the crest of the lower ridge (Fig. 3, right). The lower teeth are then set to occlude with the upper teeth on a wax trial plate so that the entire setup may be tested again

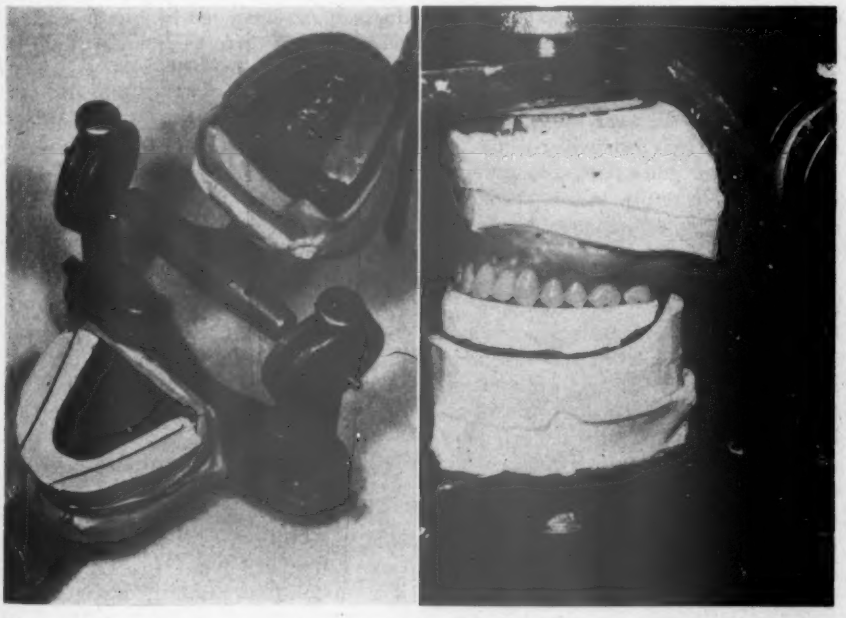

Fig. 3.—Left: Primary stone path with guidelines. Right: Upper teeth set to occlude with primary stone path

in the mouth for esthetics. No great effort need be made at this time to secure accurate interdigitation of cusps or tooth-to-tooth balance in eccentric positions. This will be secured in a later step.

In those cases in which the lower ridge is considerably buccal to the upper, the upper teeth may be placed lingually to the stone guideline. This will result in a crossbite relationship of all or part of the posterior teeth. More cases should be set in partial or total crossbite relationship than is the custom. Cuspal balance is just as easily obtained and greater stability is insured by allowing a correct relationship of the teeth to the supporting ridge. In cases of crossbite it helps to use lower posterior teeth of a larger mold than the uppers. For instance, 30 mm. uppers with 32 mm. lowers and 32 mm. uppers with 34 mm. lowers.

If the esthetic result is approved, the upper cast is now removed from the articulator. As mentioned earlier, the base of the cast has been grooved so that, after processing and before removal of the denture from its cast, it may be reseated accurately on the articulator and the porcelain teeth adjusted by grinding so that all posterior cusps will rest on the stone occlusal guide. Processing, even when most carefully done, produces errors which should be corrected at this time.

The stone guide has now fulfilled its purpose. The stone is removed from the baseplate and a rim of black compound is substituted. While the compound is still soft, the upper denture, still attached to its cast on the articulator, is closed into it and the compound is chilled. Thus, after the upper denture is finished and the cast destroyed, it can be accurately remounted on the upper articulator arm.

The final fa. or to be incorporated into the dentures is tooth-to-tooth balance in all positions. The lower wax model of the denture now may be articulated with the finished upper denture on the adjustable articulator, after the technic recommended for the use of this instrument. It is common knowledge, however, that, as yet, no instrument has been developed with which it is possible to duplicate exactly the movements of the jaw.

Until a truly anatomic articulator has been developed, I believe that much more accurate cuspal balance may be obtained by following a method first described by Meyer.[6] Especially is this true in cases where an effort to follow the conventional interdigitation of the posterior teeth would result in a violation of the principle of correct tooth to ridge placement. Examples of this are those patients with either a retrusive or protrusive lower jaw or those whose relatively larger size of the lower jaw makes necessary a crossbite relationship of part or all of the posterior teeth.

By development of a cuspal path in stone and the grinding of lower teeth to this path, as suggested by Meyer, an occlusal pattern or form of lower tooth is developed automatically by grinding. This grinding is accomplished at the correct vertical and horizontal points. The cuspal forms developed will meet the requirements of perfect tooth-to-tooth balance in all occlusal positions of the mandible. In all occlusions the pressure will be distributed equally. True, some of the lower occlusal patterns will differ radically from the conventional carvings of the so-called anatomic molds furnished by the tooth manufacturers. But why should we attempt to make the patient fit a stereotyped occlusal pattern? It is more logical to make the pattern fit or harmonize with the individual patient's needs.

I recently found this sentence in an old article written by Bonwill[9] about the time of the Civil War. "It is taught that it is vandalism to grind the antagonizing

9. Bonwill, W. G. A., Articulation of Artificial Teeth, from *American System of Dentistry*. Philadelphia: Lea Brothers, 1887, p. 486.

surfaces of the teeth, as if there was but one magnate to see them, the manufacturer."

Cuspal Path Technic

A brief description of the Meyer cuspal path technic follows.

The finished upper denture has been remounted on the articulator, as previously described, by means of a hard compound biterim. With a very sharp, small knife, compound is trimmed away from the occlusal surface of this biterim in such a way as to leave only the projections which have been forced into the central groove and sulci of the upper teeth. This trimmed rim is tried in the mouth and the relationship of these projections of the compound is studied in centric and all occluding positions of the mandible. Errors in balance are corrected by changing the depth of upper sulci by grinding, by lowering the compound projections, or both. For instance, if it is found that in a lateral position the buccal cusps of the upper bicuspids do not touch the compound, the upper sulci are deepened slightly and a tiny bit of compound is added to compensate for the change. All portions of the occlusion in all positions are thus examined and treated. Meyer calls this "cusp and sulci analysis," and it is continued until it is evident that, in all lateral occlusions, all buccal cusps touch the compound ridge on the working side and all lingual cusps on the balancing side. The protrusive and retrusive occlusions are balanced in a similar manner. When this step is concluded, multiple contacts of the upper teeth with the projections of the lower compound will be present in all positions of closure.

Cuspal tracing wax is now added to the compound rim to a height slightly above the compound ridges. The patient closes into this waxed surface in centric position until the compound shows through the wax. Registrations of the cuspal paths of the upper teeth relative to the lower are now made by directing the patient to slide the lower jaw into each and every possible position. This cuspal path is placed on its cast on the articulator, the upper mounting plate carrying the upper denture is removed and another mounting plate is substituted. The wax path is poured in stone and fixed to this mounting plate in the correct vertical position (Fig. 4, left). The lower teeth are then ground to fit the stone path intimately (Fig. 4, right).

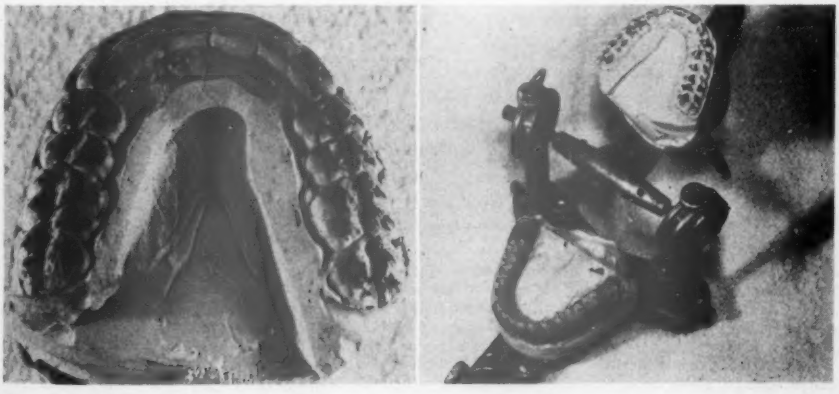

Fig. 4.—Left: Close-up of stone cuspal path. Right: Lower teeth are spot ground accurately to stone cuspal path

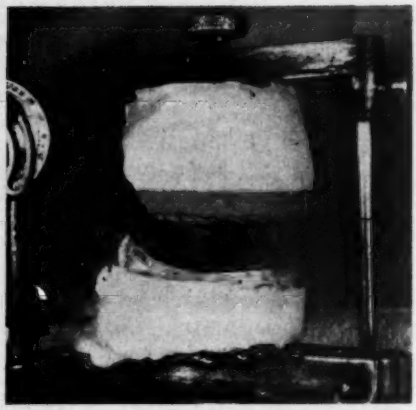

Fig. 5.—Side view, showing lower teeth fitted to stone cuspal path

After the stone path is smeared with Prussian blue pigment, accurate fit is obtained by spot grinding the porcelain teeth to it until each shows close adaptation to the stone.

The keyed lower cast is removed from the articulator and the denture is processed. It is returned to the articulator in a manner similar to that described for the upper denture, and errors in processing are corrected (Fig. 5) after which it is removed from the cast and finished.

Summary

The occlusal balance of full artificial dentures is governed by several factors in addition to what is generally thought of as cuspal balance.

1. The vertical dimension of the denture space must be determined accurately and maintained.

2. The posterior cusps which receive the centric occlusal stress must be placed over the crests of the ridge.

3. The functional horizontal occluding position must be registered accurately.

4. Equal pressures on cusps must be present in all occluding positions of the mandible.—*Aurora National Bank Building.*

Hospital Plans.—The Hospital Service Plan Commission has reported that there are twenty-eight medical or surgical prepayment plans operating in nineteen states in coordination with approved Blue Cross hospital plans. The total membership of these plans was more than two million at the end of 1945. Under the medical service type of plan, participating physicians agree to accept the corporation's fee-schedule payment as full compensation for the service provided. These benefits are generally restricted to participants below established income limits. In the indemnity plan the corporation's payment is applied toward the cost of the physician's charges, with no special arrangements for low income subscribers. Generally the fee-schedule allowance meets fully the professional charge.—*From Hospital Service Plan Commission, American Hospital Association: Non-Profit Medical Service Plans, November 1945.*

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LON W. MORREY, D.D.S., *Editor*

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EDITORIALS

NATIONAL CONFERENCE ON PROSTHETIC DENTAL SERVICE

THE conference conducted by the Committee on Prosthetic Dental Service of the American Dental Association at the Stevens Hotel in Chicago, June 13 to 15, was in some ways an unusually successful and productive meeting. Representatives were present from forty-four states. The program as announced in advance was carried out in every detail. All of the papers promised were presented. The panels on the second day, devoted to the education of dental laboratory technicians and the organization and the regulation of dental laboratories and technicians, brought forth spirited discussion and resulted in the adoption by the entire conference of several significant resolutions at the concluding session.

The requirements for the training of dental laboratory technicians prescribed by the Council on Dental Education were endorsed, and the conference unanimously held that the most promising atmosphere and environment for such training is under the auspices of an accredited dental school. Consideration was given to the possibility of the establishment of vocational schools for this purpose by responsible educational agencies on a nonprofit basis beyond the high school level. The Council on Dental Education was requested to study the accomplishments of this type of school with a view to its possible recognition on a par with a school conducted under the auspices of a dental school. The conference was unqualifiedly against the continued training of dental laboratory technicians in proprietary schools and disturbed at the current multiplication of such schools designed primarily for profit under the generous provisions of the G. I. Bill of Rights. The conference also looked with disfavor on the attempt to train technicians in public vocational schools on the secondary level. It was apparent from data presented by several speakers that the students now enrolled in proprietary schools and in apprenticeship training in dental laboratories and dental offices far exceed the number who will be able to find permanent gainful employment in this field.

The Committee on Prosthetic Dental Service from the beginning of its activities has had difficulty in finding a basis for cooperation with dental laboratories on a national scale. The reason for this situation was brought out clearly at the conference. The laboratory craft has no unified national voice. Two rival organizations mainly occupy the field.

These organizations were given a hearing at the conference. They showed little disposition to get together. The conference issued an unmistakable challenge to the "ethical dental laboratories of the nation" to set up one national organization with a structure similar to that of the American Dental Association. Effective cooperation with the dental profession in the accomplishment of common ends is hardly possible until the organized profession can deal with the organized craft on a national basis. The laboratories in some quarters have been scornful of the policies of the profession. There is little ground for complaint on the part of the laboratories so long as they continue to wrangle among themselves. The profession and the craft have come to the point where they are dependent on each other. The profession now challenges the craft to establish a unified front in order that rational consideration of mutual problems may go forward without bickering on the side lines over trivialities resulting in inevitable delays.

It must be admitted, however, that the profession yet lacks complete unity of thought and action when it comes to the regulation of the laboratory and to the recognition of the technician. Although the conference went on record as favoring "the principle of accreditation" of laboratories and against legislation of any kind at this time, there were marked undercurrents of differing views. There are laboratories and state dental societies which strongly advocate self-regulation of the laboratory and no restriction on the technician. There are laboratories and state dental societies which urge the regulation of the laboratory and the licensing of the technician by law. There are laboratories and state dental societies which favor accreditation of laboratories, under the plans now being carried out by the Committee on Prosthetic Dental Service, as the best means of solving the problems now before both the profession and the craft.

The conference labored valiantly to reach a common ground but went home aware that radical differences in view still prevail. It almost could be said that the laboratories challenge the profession to come to a working understanding regarding the manner in which dentistry proposes to deal with the laboratory and the technician in the future. To be sure, the American Dental Association not only has approved the principle of accreditation but also has constituted a committee to put it into effect. The Association also has indicated clearly its opposition, at least at this juncture, to the licensing of technicians.

There is great need at present for temperate action and for the firm establishment of a broad national policy. Only one state has attempted legislation and it is reported to be dissatisfied with this undertaking. It is difficult to see why any state feels it should bolt ahead with legislative experiments before the issues which may be ironed out without legislation are determined. The burden of proof is strongly upon the state dental society which insists on going forward with restrictive legislation when the present status of professional opinion counsels against it. The laboratories are engaged in a business which is highly essential to the dental profession under the prevailing conditions of modern practice. The technicians are craftsmen employed mainly by this business. The complete regulation of a business by law and the licensing of the workers in a business by law may lead to endless complications especially if eventually there should be forty-nine different legislative procedures in the country.

Accreditation as yet has not had a fair trial. The relatively slow progress being made, even in the face of the earnest endeavors of the Committee on Prosthetic Dental Service, is not due entirely to differing views in various parts of the country. The committee is attempting an extremely difficult task without adequate facilities. It undertakes to deal administratively through state prosthetic dental service committees but has no full-time nor part-time personnel for coordinating essential tasks at the headquarters of the American Dental Association. There are more than 5,000 dental laboratories in the country potentially subject to inspection and accreditation. Cooperation with state agencies is desirable and helpful but the motivating force is too remote. Sufficient personnel should be available to the Committee on Prosthetic Dental Service at the headquarters of the American Dental Association so that the conflicting efforts of state agencies could be coordinated.

A basic criticism of the plan for accreditation, revealed at the conference, is that the requirements place too much emphasis on the physical aspects and appointments of the laboratory and too little on the quality of its finished work. It would appear that the Committee on Prosthetic Dental Service is attempting to urge upon the laboratory craft types and styles of equipment, modes of practice, training of technicians and numerous other details of conducting the business. All these requirements may be entirely proper, but even when all are combined they do not assure a satisfactory product. The basic test of a laboratory, assuming that its business is conducted ethically in accordance with the tenets of the American Dental Association, is the work it turns out on the prescription of dentists. The requirements for the accreditation of a laboratory might well be centered on this essential test rather than on details of equipment and management. The public in buying a watch, a radio or a refrigerator wants to know whether the mechanism offered for sale will do what its makers claim for it, and is not concerned directly about what takes place in the factory. The analogy is not perfect but it may point the way to a shifting of the emphasis in the appraisal of the work of a dental laboratory.

Other considerations which might help to clear the air were voiced informally at the conference.

Laboratories and technicians will make a distinct contribution toward closer cooperation between the dental profession and the craft they represent when, for once and all, they stop fatuous talk often heard about the laboratory as a professional institution and about the technician as a professional man. The business of conducting a laboratory and the work of the skilled craftsman are legitimate enterprises as adjuncts of the dental profession and as such can be dignified by recognition in their own right.

Progress will be made when the leaders in the management of laboratories, who are primarily business men and not educators, get over the dogmatic position, which many of them take, that there is only one way by which a dental technician may secure his basic training, namely, by the apprenticeship system in a laboratory. This assumption on the part of business men is contrary to the tenets of modern education. Training under supervision in a laboratory is desirable and useful, but the value of formal basic training under the guidance of responsible educational agencies can hardly be denied.

Perhaps the final solution of the problem is contingent on the day when laboratories and dentists everywhere agree, and live up to the agreement, that the dental patient under no circumstances shall cross the threshold of a commercial dental laboratory at the front door or at the back door. This breach of professional conduct, it must be admitted, is chargeable to dentists quite as much as to laboratories.

INTERNATIONAL CORRESPONDENCE

News from Great Britain

The Dental Board of the United Kingdom

Some points of interest were mentioned by Dr. E. Wilfred Fish in his opening address as chairman of the Dental Board of the United Kingdom at its recent session in May. He said that there is most likely to be a return to the prewar charge for the retention fee of four pounds ($20) and a distinct possibility that the amount might be increased above that figure. Dental officers in the Royal Navy, the Army and the Royal Air Force, exempt during the war, will be required to pay the fee from next year onward. (Only those on the Dentists Register can practice dentistry in Britain. Registration is an annual necessity for all dental practitioners. There is a fee for this annual registration to retain one's name on the Dentists Register, and this fee is called the retention fee.)

As the Government through the University Grants Committee was subsidizing undergraduate education the Board was considering how to coordinate postgraduate education and it had hopes that Britain would become a center of this type of instruction for the Empire and Europe. Toward this end the Board, during the session, resolved that a central organization should be constituted and officially entitled "The Joint Advisory Committee on Postgraduate Dental Education."

Background.—The Dentists Act of 1878 established dentistry as a profession in Britain. It recommended among other things that a register be formed of persons specially qualified to practice dentistry. The care and responsibilities of the Register were entrusted to the General Medical Council. As a result of the Dentists Act of 1921 the Dental Board of the United Kingdom was formed. It took over the responsibility for keeping the Dentists Register. Also, it was authorized to investigate breaches of ethical conduct on the part of those on the Register, but it was not given powers to exercise disciplinary measures. After investigation of such a case the findings and recommendations must be referred to the General Medical Council for any necessary action. Matters concerning dental education were likewise left in the hands of the General Medical Council. The composition of the Board is as follows: The chairman is appointed by the Privy Council and there is a representative from each of the following: the Ministry of Health, the Department of Health for Scotland, the Government of Northern Ireland, the qualified dentists of England and Wales, the qualified dentists of Scotland, the qualified dentists of Ireland and a representative of the Dentists Act of 1921. The General Medical Council has three representatives and the Board elects two members itself.

British Dental Students Association

The annual convention of the British Dental Students Association was held at Leeds in July under the presidency of T. Talmage Read, professor of dental surgery at the University of Leeds. The program included an address by the Rt. Hon. Mr. Aneurin Bevan, Minister of Health, and a lecture by Dr. H. V. Dicks, professor of psychiatry, entitled "The Human Being Behind the Denture." Dr. H. J. Rogers, the Nuffield Research Fellow in Oral Biology, presented an excellent paper entitled "Dental Research and Scientific Method."

Dental Students' Journal

The first number of the *Journal of the British Dental Students Association* has been published. It is the official journal of the association and the plan is to publish three numbers each year. The first number contained the following articles: "The Contribution of the British Dental Students Association" by Professor Read; "Careers in Dentistry" by Dr. Fish; "The Use of Trained Ancillary Personnel in Dental Surgery" by Maj. Gen. John P. Helliwell; "The Royal Army Dental Corps" by Brigadier Broderick; "Your American Confreres" by Prof. E. Matthews; "Student Life in American Dental Schools" by G. Heaton, and "Dental Education in Japan" by S. L. Markanday.

Dental Personalities in the News

In the King's Birthday Honours List it is announced that Dr. E. Wilfred Fish has

been made a Commander of the Order of the British Empire. Dr. Fish is the chairman of the Dental Board of the United Kingdom and is the foremost dental research worker in Britain.

Edward Samson took office as president of the British Dental Association. He has all the qualifications necessary to make him a worthy successor to Dr. Lilian Lindsay, the most outstanding personality in British dentistry today. Mr. Samson is a private practitioner in Bournemouth and in addition holds several public dental appointments. He is the author of a dozen books on dental subjects ranging from one on practice management to more historical records as found in "The Immortal Tooth." He is probably best known as a dental essayist and for many years he has contributed and illustrated clever essays on a great variety of dental subjects in the *Dental Magazine and Oral Topics.*

Dr. Marie Gayler is a scientist, not a dentist. Yet it is with great pleasure that we received the news of her being made an honorary member of the British Dental Association. She was responsible for research in the properties of amalgams, an investigation which in the past decade turned out to be one of the most important contributions to dental research by a British worker.

Adam Cubie was scheduled to be made an honorary member of the association. As a practitioner in Glasgow he has represented the qualified dentists of Scotland on the Dental Board for many years.

During the convention of the British Dental Students Association at Leeds in July, the degree of Doctor of Philosophy was conferred by the University on two very distinguished dentists, Mr. H. A. Mahoney, L.D.S. Ed., and Mr. W. G. Senior, L.D.S. Mr. Mahoney is the principal dental officer of the Ministry of Health and as such was responsible for the organization of the dental section of the Emergency Medical Service during the recent war. We are proud of the part our profession played in this Service under the leadership of Mr. Mahoney. The Jaw Injury Units were included.

Mr. Senior has been dental secretary of the British Dental Association since 1931. He has done outstanding work for British dentistry, especially during the war when that upheaval added greatly to his responsibilities in the dental matters connected with the National Health Service. As the various stages of the scheme were unfolded there were calls from all parts of the country for Mr. Senior to come and explain the latest developments. Britain is not a large country; yet Mr. Senior has traveled tens of thousands of miles to tell practitioners in his easy lucid way of the implications of the Health Service. He has been called the diplomatist of dentistry.

Dentists visiting the summer exhibition of the Royal Academy at Burlington House, London, are particularly interested in exhibit 1313. It is a head in bronze of the Welsh poet Hew Menai and is the work of a Swansea dentist, Mr. Jenkin Evans. In the sphere of the fine arts it is a very great honor to exhibit at the Royal Academy.—*John Boyes, University of Durham, Newcastle Upon Tyne 2, England.*

A. D. A. AFFAIRS

THREE WINNERS ANNOUNCED IN JUNIOR PRIZE ESSAY CONTEST

Winners of the junior prize essay contest have been named from three of the four dental school zones by the Committee on Membership of the American Dental Association. The judges declared that there was "no contest" in Zone 1.

The winners are: Zone 2, Bert W. Gilbert, School of Dentistry, Indiana University, Indianapolis; Zone 3, Herman Joseph Lyn, Chicago College of Dental Surgery, School of Dentistry, Loyola University, Chicago, and Zone 4, Donald James Passmore, Dental School, University of Oregon, Portland.

The winning students received a trip with all expenses paid to the eighty-eighth annual meeting of the American Dental Association in Boston.

MANUAL FOR SCHOOL DENTAL HEALTH PROGRAMS IS PUBLISHED

A dental health program manual for elementary and secondary schools was published recently by the Council on Dental Health of the American Dental Association.

The manual was prepared by the Council's Committee on Dental Health for Children and Youth, with the help of Carl A. Jessen, U. S. Office of Education, Washington, D.C.; Herold C. Hunt, superintendent of the Chicago public schools, formerly on the Board of Public Schools, Kansas City, Mo.; Frank C. Neff, American Academy of Pediatrics, Kansas City, Mo., and Mrs. James C. Parker, National Congress of Parents and Teachers, Grand Rapids, Mich., as principal consultants.

Copies of the manual may be had by writing to the Council on Dental Health, American Dental Association, 222 East Superior St., Chicago 11.

DENTAL SOCIETIES

SEVENTH ANNUAL CHICAGO PRIZE ESSAY CONTEST IS ANNOUNCED

The Chicago Dental Society is sponsoring its seventh annual prize essay competition to stimulate research in all phases of the science of dentistry. The author of the winning essay will receive a cash award of $500 and a trip with all expenses paid to the society's eighty-third midwinter meeting, to be held at the Stevens Hotel, Chicago, February 9-12, 1948.

Members of the American Dental Association or other persons of scientific attainment affiliated with a recognized institution in the dental field are eligible to apply for entrance in the competition, provided written application is filed before October 1.

Application forms may be secured by writing to the Chicago Dental Society, 30 North Michigan Ave., Chicago 2.

MONTREAL DENTAL CLUB WILL HOLD FALL CLINIC OCTOBER 22-24

The twenty-third Annual Fall Clinic under the auspices of the Montreal Dental Club will be held October 22-24, at the Mount Royal Hotel. The program will include limited attendance clinics of one and two hours' duration, progressive clinics, essays, table clinics, visual education and other features.

Practitioners who are interested in presenting a table clinic at this meeting should communicate with C. C. Bourne, 1414 Drummond St., Montreal.

NEW JERSEY SOCIETY GIVES HONOR AWARDS IN PEDODONTICS

Two honor awards for outstanding effort in the field of pedodontics were presented at the annual luncheon meeting of the New Jersey Society of Dentistry for Children, held recently in conjunction with the seventy-seventh annual convention of the New Jersey Dental Society.

J. M. Wisan, Trenton, chief of the Dental Health Division of the New Jersey Department of Health, received the certificate of merit awarded annually by the society to a member of the profession for salient services in the promotion of dentistry for children. The award was presented by Kenneth A. Easlick, professor of dentistry, University of Michigan.

Edward R. White, Jersey City, president of the New Jersey State Dental Society, presented the certificate of merit to Msgr. Peter O'Connor, North Arlington, N. J., chosen as the layman who had contributed most to the promotion of pedodontics.

Following the luncheon, Dr. Easlick gave an illustrated talk on "Adequate Restorations for Deciduous Teeth."

During the business meeting it was resolved that the president appoint a committee to formulate a new constitution and bylaws in harmony with the growth and progress of the New Jersey Society of Dentistry for Children.

WEST COAST DENTAL MEDICINE SEMINAR MEETS OCTOBER 19-24

The West Coast's fourth annual seminar for the study and practice of dental medicine will be held October 19-24 at the Ahwahnee Hotel, Yosemite Valley, Calif., according to an announcement by Hermann Becks, president of the board of directors and professor of dental medicine at the University of California.

Sponsored by all the Pacific Coast dental associations, the seminar combines lectures with informal group discussions and question periods. The lectures will be on nonmechanical subjects, emphasizing the application of the basic sciences to the practice of dentistry, and will include such topics as nutrition, enzymology, endocrine disturbances, virus diseases and protein biology.

Among the speakers will be William A. Albrecht, University of Missouri; Allan G. Brodie, Isaac Schour and John B. Youmans, University of Illinois; Thomas Francis, Jr., Howard B. Lewis and L. H. Newburgh, University of Michigan, and Gustav W. Rapp, Loyola University, Chicago.

The number attending the seminar will be limited. Applicants are required to submit a case report and must have attended a postgraduate course in the basic sciences or its equivalent during the current year.

DIETETIC ASSOCIATION WILL HOLD MEETING OCTOBER 13-17

The American Dietetic Association will hold its thirtieth annual meeting October 13-17 in Philadelphia, according to an announcement by the executive board of the association.

LATEST DENTAL SOCIETY ACTIVITIES AND MEETINGS

Arizona.—The newly elected officers of the Arizona State Dental Society are John A. Hamblin, Mesa, president; Raymond D. McDonald, Tucson, president-elect; Frank G. Heisser, Safford, vice-president, and Bown K. Litt, Tucson, secretary-treasurer.

Illinois.—The eighty-third annual meeting of the Illinois State Dental Society will be held October 8-11, at the Hotel Marquette, Peoria.

Indiana.—The Northern Indiana Dental Society will meet October 22-23 at Kokomo. W. F. Maxwell, 604 Citizens Bank

Edward C. Mills Leaves Post
Edward C. Mills, Columbus, in relinquishing his position as secretary of the Ohio State Dental Society, explains the records to his successor, Earl G. Jones, Columbus

Bldg., Kokomo, is chairman of local arrangements.

Michigan.—A pamphlet, titled "A Few Tips From Your Dentist," has been published by the Full Denture Section of the Detroit Clinic Club to guide patients in the use and care of dentures.

New York.—The forty-fifth annual meeting of the Alumni Association of the School of Dentistry, University of Buffalo, will be held at the Hotel Statler, Buffalo, October 14-16. The Eighth District Dental Society of the State of New York has charge of the first day's program.

The Northeastern Society of Orthodontists will hold its next meeting November 10-11, at the Waldorf-Astoria Hotel, New York. Officers of the society elected at the recent annual meeting are John W. Ross, Philadelphia, president; Norman L. Hillyer, New York, president-elect; Lawrence W. Baker, Boston, vice-president; Oscar Jacobson, New York, secretary-treasurer, and J. A. Salzmann, New York, editor.

Oklahoma.—The executive council of the Oklahoma State Dental Association recently appointed Richard Tunnicliff, Oklahoma City, to the position of executive secretary. Mr. Tunnicliff took up his duties on July 1 at the temporary offices established in Oklahoma City.

DENTISTRY ABROAD

DENTAL SURGEONS WILL HOLD SEPTEMBER CONGRESS IN ITALY

The National Congress of Dental Surgeons will be held in Genoa, Italy, September 17-21, 1947.

The Boccanegra Castle on the grounds of the San Martino Hospital in Genoa will be the scene of the convention.

HUNGARIAN DENTAL CONGRESS WILL MEET SEPTEMBER 18-21

The dentists and oral surgeons of the Hungarian Medical Union will hold a memorial congress September 18-21 in Budapest.

Among the subjects to be discussed are treatment of diseases of the pulp and use of acrylic resins.

SOCIALIZED NATIONAL HEALTH PROGRAM PLANNED IN AUSTRALIA

A national medical service bill to set up administrative machinery for socializing medicine will be brought before the Australian Parliament in September, according to Senator McKenna, Minister for Health and Social Services.

Separate bills will be introduced later to deal with the appointment of medical men; recruitment, training and registration of nurses, and other details of the plan.

Physicians, dentists and other qualified practitioners would be entitled to practice in their own or any other state without the necessity of registering in more than one state under the provisions of the proposed legislation.

BRITISH DENTISTS AND PHYSICIANS ADOPT NEW RULES OF ETHICS

The British Dental Association and the Council of the British Medical Association recently approved specific rules governing consultations and anesthetics which are to be used as a guide to interprofessional relations between physician and dentist.

The following rules governing consultations were confirmed:

(1) Where a patient, in the opinion of his medical attendant, needs simple dental treatment, the patient should be referred in all but exceptional circumstances to his own dentist. In the event of the patient having no regular dentist, there is no objection to a doctor recommending a dentist of his own choice.

(2) Where a doctor (for the benefit of one of his patients) requires to consult a dentist, the doctor should communicate, in the first instance, with the patient's own dentist. In the event of the patient having no regular dentist there is no objection to the doctor consulting the dentist of his own choice.

(3) Where, for any reason, the patient's doctor considers that the patient should be sent to a dentist other than his own, or where a further dental opinion is sought, the patient's usual dentist should be informed.

Note: Apart from a simple dental treatment, i.e., in the presence of a dental condition which might affect the general health of the patient or necessitate a major dental operation, the dentist should consult the patient's doctor before carrying out such treatment.

On anesthetics it was approved that:

Where an anesthetic is advised by the dentist, it is competent for him to select the anesthetist, but if such anesthetist is not the patient's doctor, no objection should be taken to the patient inviting his doctor to be present. Where the operation proposed is a major one, or if it is known to the dentist that the patient is under medical care, the dentist should consult the patient's doctor upon the operation proposed and should invite him to be present if the patient so desires. Similarly, where the patient is under dental care and the doctor advises operation or other major treatment arising from the patient's dental condition, the dentist should be consulted.

On the completion of any dental operation, and especially if there is any reason to think that postoperative complications may ensue, the patient should be advised to consult the dentist immediately if such complications arise and the dentist should take all reasonable steps to facilitate such consultation.

The *British Dental Journal* announces that the British Dental Association will raise an amendment to the Finance Bill, designating the removal of toothbrushes from the list of articles on which purchase tax is chargeable. Revival of the practice of supplying school children with toothbrushes at greatly reduced prices will be suggested in connection with priority dental services which are provided under the National Health Service Act.

AMERICAN DENTAL SOCIETY OF EUROPE CHANGES 1948 MEETING

The American Dental Society of Europe will hold its first meeting since the war in London, July 27-30, 1948.

It had been announced previously that the meeting would follow the Olympic Games which will be held in London from July 29 to August 14, 1948.

ARMY AND NAVY

COL. TERRY P. BULL IS AWARDED ARMY COMMENDATION RIBBON

Col. Terry P. Bull, who returned to the United States recently from duty as chief of the dental service in the Far East Command, has been awarded the

Army Commendation Ribbon for his outstanding services rendered between October 1945 and March 1947.

Colonel Bull is now a patient at Letterman General Hospital, San Francisco.

FORTY-SEVEN IN NAVAL DENTAL CORPS RECEIVE CERTIFICATES

Thirty-eight reserve officers and nine regular officers of the U. S. Naval Dental Corps recently were awarded graduation certificates at the Naval Dental School, National Naval Medical Center, Bethesda, Md., by Rear Admiral Clifford A. Swanson, Surgeon General of the Navy.

The awards marked the conclusion of a two weeks' course of instruction in Naval Dentistry for the reserve officers and a six months' postgraduate course in Naval and Professional Indoctrination for the regular officers.

Principal speaker at the graduation exercises was Rear Admiral Alfred W. Chandler (DC) USN, Assistant for Dentistry and Chief of the Dental Division. The speakers on the program were introduced by Captain C. V. Rault (DC) USN, Commanding Officer of the Naval Dental School.

ARMY DENTAL INTERNS BEGIN YEAR OF TRAINING

Twenty-five dental interns began their year of internship training July 1 at six Army general hospitals designated by the War Department.

The six hospitals at which this training will be conducted are Brooke General Hospital, Fort Sam Houston, Texas; Fitzsimons General Hospital, Denver; Letterman General Hospital, Presidio of San Francisco; Oliver General Hospital, Augusta, Ga.; Percy Jones General Hospital, Battle Creek, Mich., and Walter Reed General Hospital, Washington, D. C.

The internship training will include sections on roentgenology and oral diagnosis, one month; operative dentistry, three months; oral surgery, three months; periodontia, one month, and prosthetic dentistry, four months.

In addition, during the course of the year conferences will be held on clinical pathology, professional staff, oral surgery, prosthetic dentistry, roentgenology, reviews of dental literature, and formal teaching ward rounds or chair instruction.

VETERANS

VA ANNOUNCES TIME EXTENSION ON SERVICE LIFE INSURANCE

The Veterans Administration announced recently that the reinstatement privileges now in effect for National Service Life Insurance will be extended to January 1, 1948.

Until this announcement was made, World War II veterans who had let their wartime term policies lapse for a period of more than three months had only until midnight, August 1, to reinstate them without having to take a physical examination.

Every former policyholder can reinstate his government insurance from now until January 1 merely by certifying that he is in as good health as he was at the time of lapse and by filling out the required application. Two monthly premiums must accompany an application for reinstatement of term insurance.

DENTAL EDUCATION

E. D. COOLIDGE IS WINNER OF CALLAHAN MEMORIAL AWARD

Edgar D. Coolidge, Evanston, Ill., professor of therapeutics, preventive dentistry and oral hygiene of the School of

Dentistry, Loyola University, has been named the winner of the Callahan Memorial Award of the Ohio State Dental Society. This award is given annually to a person who makes contributions of exceptional value to dental science.

Dr. Coolidge was honored for his outstanding work in root canal therapy and periodontia. He will receive the medal at the annual meeting of the Ohio State Dental Society in Cleveland in November, when he will read a paper before the members of the society.

LOYOLA OPENS DRIVE FOR NEW MEDICAL AND DENTAL CENTER

Samuel Cardinal Stritch, Catholic archbishop of Chicago, announced the opening of a campaign for $12,000,000 for a new medical and dental school center, part of a $24,000,000 Fulfillment Fund program planned by Loyola University. Cardinal Stritch, who will be honorary chairman of the campaign, made the announcement at a dinner gathering of thirty prominent industrialists and business and professional men at the Union League Club in Chicago.

The new medical center will be located in the medical center district on the Near West side. Preliminary estimates place the cost of the structure at $3,000,000. As announced by Cardinal Stritch and the Very Reverend James T. Hussey, S.J., president of Loyola, the school's present medical and dental buildings will be vacated and the two schools will be combined in the new center.

The remaining $9,000,000 of the medical fund will be used for endowment, the income to be utilized to maintain the building and to support medical and dental research.

Emphasizing the importance of education in the two professional fields, the Cardinal stated that there are seventy medical schools and forty dental schools in this country. He pointed out that, of the medical schools, forty-three, or approximately 60 per cent, must depend on private funds and student fees for support, and in the dental field twenty-seven schools, or 69 per cent, are in the same position.

Loyola's medical institutions are among the oldest in the Midwest. The dental school, known as the Chicago College of Dental Surgery, was founded in 1883, and the medical school was started in 1868 as the Bennett Medical College and was purchased by the Jesuit fathers in 1915.

COLUMBIA STUDENTS REPRESENT U.S. AT LONDON CONFERENCE

At the request of the Union Dental Students' Society of Leeds University, two students from the School of Dental and Oral Surgery, Columbia University, represented all American dental student bodies at the annual General Conference of the British Dental Students' Association in Leeds, England, July 15-19.

The delegates who were nominated by the Student Council of the Columbia school are Arthur Zinn, Jr., of San Diego, Calif., and Gabriel I. Auerbach of Springfield, Mass. They are attending the conference on traveling scholarships granted by the university.

The two students will also visit French dental schools as well as several schools in Holland which have sent graduate students to Columbia.

SIX NAMED TO OMICRON KAPPA UPSILON AT INDIANA UNIVERSITY

Election of five graduating seniors and one alumnus of the School of Dentistry, Indiana University, to Omicron Kappa Upsilon, national scholastic dental fraternity, was announced at the school's annual "Honors Day" ceremonies in June.

The students elected were Harold J. Compton, Frankfort, Ind.; Hudson G. Kelley, Raleigh, N. C.; Daniel Laskin, Ellenville, N. Y.; William Lawrence, Kingston, Mass., and Martin O. Walton, Melcher, Iowa.

The special Omicron Kappa Upsilon award was given Clyde L. Hine, Tuscola, Ill., a member of the class of 1904 and the father of Maynard K. Hine, dean of the School of Dentistry, in recognition of his contributions to the profession of dentistry. He is a past president of the Eastern Illinois Dental Society.

Other awards made were: Mr. Laskin, Mosby award for achievement in oral surgery; Mr. Kelley, Mosby award for special interest in orthodontics; Richard S. Johns, Hammond, Ind., American Society of Dentistry for Children award for special interest in dentistry for children; Miles Shepard, Wenatchee, Wash.; Norman Alley, Coconut Grove, Fla.; Mr. Kelley, and John Lindquist, Rockford, Ill., Leonard Singer Memorial Essay awards.

NEW DENTAL DEANS APPOINTED AT PITTSBURGH UNIVERSITY

Chancellor R. H. Fitzgerald of the University of Pittsburgh has announced the appointment of Lawrence E. Van Kirk as dean of the School of Dentistry and of William F. Swanson as associate dean. Their appointment follows action of the executive committee of the University's board of trustees.

The new dean and his associate have had parallel careers. Both are graduates of colleges in western Pennsylvania and of the School of Dentistry, University of Pittsburgh. Both hold master of science degrees from the Graduate School of the University of Pittsburgh. The two men have been fellows of the American College of Dentists and each has had long service on the faculty of the University of Pittsburgh. Dr. Van Kirk and Dr. Swanson each has served as president of the Odontological Society of Western Pennsylvania.

Dr. Van Kirk is a practicing dentist in Pittsburgh. He is a member of the board of trustees of the Pennsylvania State Dental Society. He is also a trustee of the Federation of Social Agencies and chairman of its group work division and is a board member of the Y.M.C.A. He was instructor in the School of Dentistry, University of Pittsburgh, from 1919 to 1932. He holds the degree of bachelor of science arts from Washington and Jefferson College, where he won the Samuel Jones Prize in physics.

Dr. Swanson is professor of histology and bacteriology. His service at the University of Pittsburgh has been continuous since 1920 except for a year and a half when he practiced dentistry in Philadelphia. He is a member of the district, state and national dental associations. He has written for dental and public health journals. Among his articles are writings on vitamin C as applied to the teeth, prepared in collaboration with Charles Glenn King, discoverer of the vitamin. Dr. Swanson received his bachelor of science degree from Pennsylvania State College.

PUBLIC HEALTH

NEW YORK DIVISION OF DENTAL SERVICES RAISED TO BUREAU

The establishment of a Bureau of Dentistry within the Department of Health of the City of New York was announced recently by Health Commissioner Israel Weinstein.

The dental services of the Department of Health formerly were carried on through the Division of Dental Services within the Bureau of Child Hygiene. The change raises the status of the division to that of a bureau operating

under the direct supervision of the commissioner.

Harry Strusser, who was the dentist in charge of the division, has been named director of the new bureau. Dr. Strusser has been with the Department of Health since 1928 and in charge of the Department's dental services since 1929. Henry C. Sandler, who has been with the Health Department since 1938, has been named assistant to the director of the bureau.

The new bureau employs 160 dentists and 141 dental hygienists.

USE OF PENICILLIN TO REDUCE DENTAL CARIES SHOWS SUCCESS

Initial studies by Thomas J. Hill and Albert H. Kniesner, School of Dentistry, Western Reserve University, have shown that penicillin produces a decrease in susceptibility to dental caries.

Two hundred fifty-two boys from an industrial school in northern Ohio were accepted for the experiment. One hundred sixty-one of the boys brushed their teeth for five months with a powder containing penicillin. At the beginning and end of the period, counts were made of the number of Lactobacilli acidophilus in the mouth of each boy.

At the end of the period, 65 per cent of the boys who had used penicillin in their tooth powder had a lowered L. acidophilus count and only 4 per cent had an increased count. Among the ninety-one boys who had not used the penicillin powder, 43 per cent had a lowered L. acidophilus count and 20 per cent had an increased count.

Dr. Hill declared that more positive results were desired before any recommendations for the inclusion of penicillin in dentifrices would be made.

The experiment, which is being made under grants from the U. S. Public Health Service and the Cleveland Dental Society, will continue another year.

Acme Photo

New Dental Exhibit Shown

Two young students are shown examining the structure of properly formed teeth in one of the five new dental exhibits shown by the Cleveland Health Museum at the 1947 annual meeting of the Cleveland Dental Society

SHORTAGE OF DENTISTS SHOWN IN CHILDREN'S FUND REPORT

Inability to secure a sufficient number of dentists to supply needed dental service was the principal difficulty confronting the dental division of the Children's Fund of Michigan last year, according to the eighteenth annual report submitted by William J. Norton, executive vice-president of the fund. There is no indication that this condition will be corrected in the immediate future, the report said.

The County Dental Department of this division places full time dentists in certain county areas to cooperate with the schools, the dental societies and the health authorities in discovering and treating indigent children who need dental care.

At no time during the year was the County Dental Department able to recruit and maintain a full staff. The

largest number of dentists employed in any given month was nineteen and the lowest number twelve. At the close of the year, the staff numbered only fourteen, although authority had been given by the trustees to maintain a complement of thirty-one dentists.

Seven of the thirteen dentists lost were drafted. The shortage of dentists, increasing local demand for dental service and present economic conditions were among the other reasons given for the lack of sufficient personnel.

PUBLIC HEALTH SURVEY REVEALS DENTAL NEEDS IN ILLINOIS

At the request of local health and welfare agencies, an investigation of the health needs and resources in the Chicago-Cook County area was recently made by the U.S. Public Health Service.

The report of the investigators recommended the employment of additional dental personnel in the city and county health departments, expansion of dental health education activities, continuation of studies of the dental needs of preschool children, establishment of in-service training for employed professional personnel, increase in the number of dental interns in hospitals and provision for their supervision, and adoption of a uniform system of dental records for all agencies providing dental care.

LEGISLATION

MURRAY HEALTH BILL GETS APPROVAL OF SURGEON GENERAL

Surgeon General Thomas Parran of the U. S. Public Health Service said in a statement prepared for a meeting of the Senate Subcommittee on Public Welfare that the Public Health Service prefers the Murray health insurance bill to the bill submitted by Senator Taft.

Dr. Parran approved the Murray bill as embodying five of the six points of the program long advocated by the Public Health Service. The Taft bill, he said, was a modest approach to the health problem but should be amended.

The Murray bill would set up a national system of compulsory health insurance to finance medical services for some 85 per cent of the population through a pay roll tax. The Taft bill asks Congress to provide $200,000,000 annually for five years to aid states in setting up medical care programs for low income families.

GENERAL NEWS

A.D.A. MEMBER IS OFFICIAL OF ROTARY INTERNATIONAL SOCIETY

Max M. Moore, Valley City, N. D., a member of the American Dental Association since 1923, was elected a district governor for 1947-1948 at the Rotary International Convention held recently in San Francisco. One hundred and seventy-two governors were chosen at the convention to coordinate the work of Rotary Clubs in North and South America, Europe, Asia, Africa and the islands of the Pacific.

Dr. Moore was graduated from the College of Dentistry, State University of Iowa, in 1923, and he has practiced continuously in Valley City. Prior to entering dental college, he served with the 41st Division of the United States Army in France during World War I. In addition to being a member of the North Dakota Dental Association and the Central District Dental Society, he is a member of Xi Psi Phi and Omicron Kappa Upsilon dental fraternities.

Dr. Moore served as president of the Rotary Club of Valley City in 1927-1928. As district governor, he will supervise the activities of fifty-three Rotary Clubs in

Acme Photo

Open Air Clinic Held in Tokyo

Children line up for free dental examinations at an open air clinic set up in Tokyo's business center during "Children's Week." Supported by the Civil Administration Bureau, the clinic is operated by professors and students of the Dentists College League who volunteer their services

parts of Minnesota, North Dakota, Wisconsin and Ontario, Canada, comprising the 117th Rotary District.

SEMINAR SPEAKERS REPORTED ERRONEOUSLY IN JOURNAL

It was erroneously reported in the July 15 issue of THE JOURNAL that Allan G. Brodie, University of Illinois, and Frederick B. Noyes and Charles R. Baker, both formerly of Northwestern University, were speakers at the seminar in orthodontics recently presented by the graduate orthodontics department, Dental School, Northwestern University.

The speakers on the program were Harry Sicher, Loyola University; Hays N. Nance, University of California; John R. Thompson, Northwestern University; Howard J. Buchner, Oak Park, Ill.; William B. Downs, University of Illinois; Charles W. Freeman, dean of the Dental School, Northwestern University, and Wilton W. Krogman, head of the anthropology division, University of Illinois.

DISTRIBUTE NEW BROCHURE FOR RECRUITING DIETITIANS

"Dietitians in Demand" is the new brochure being distributed to high school and college students by the American Dietetic Association to aid in recruiting for the dietetic profession.

COUNCIL ON DENTAL HEALTH

REPORTS ON RESULTS OF THE LOUISIANA DENTAL HEALTH WORKSHOP

A WORKSHOP in dental health planning was conducted in New Orleans March 7-9, 1947, by the Council on Dental Health of the Louisiana State Dental Society in cooperation with the Louisiana State Board of Health. The following report describes the purpose of the workshop and the procedures employed, summarizes the formal discussions and presents an outline of the conclusions and recommendations. The results of the workshop will be used as a basis for improving community dental health programs in the state. All of the recommendations subsequently were adopted by the Louisiana State Dental Society.—*Allen O. Gruebbel, Executive Secretary.*

Purpose

The purpose of the workshop was to enable the dental profession in Louisiana to examine critically the dental problems of the state, with the object of determining the possible solutions.

To accomplish this aim, the workshop employed two mediums: (1) presentation of factual, basic information and (2) group study and discussion of the information presented.

The workshop in itself was regarded as an immediate step toward the solution of the dental health problems, for it represented a concerted effort of dentists to meet existing dental problems in Louisiana. The conclusions and recommendations which emerged from this workshop are intended to be pooled with the results of workshops in other states to assist the American Dental Association in establishing a basis for national planning in dental health.

Method

The workshop delegates were designated as: (1) visiting members, (2) out-of-state observers and (3) group participants.

The first day of the three day conference was devoted to the presentation of factual information by twelve persons: six principal speakers and a six-man panel. Time was allowed for each speaker to answer questions from the assembly.

On the second day the delegates were divided into four groups. Each group was assigned a number of dental health problems. Group leaders led the discussions with the view of formulating recommendations designed to solve the dental health problems.

Group assignments were determined in advance and assignment cards were issued at the time of registration. Delegates were given an opportunity to change their assignments before the second day's session began.

Consultants, assigned one to each group, were: J. W. Brouillette, B.S., M.A., Ph.D., director, General Extension Division, Louisiana State University, Baton

Rouge; Simon A. McNeely, B.S., M.S., supervisor, Health, Physical and Safety Education, State Department of Education, Baton Rouge; Miss Caro Lane, A.B., M.S., consultant for exceptional children, State Department of Education, Baton Rouge, and Miss Marion Souza, R.N., B.S., M.A., supervisor, School Community Health Project, State Department of Education, Baton Rouge.

The subjects considered by the groups were: Group One: Utilization and Expansion of Dental Personnel and Ancillary Personnel (discussion leader, Thomas D. Speidel); Group Two: Community Dental Health Programs (discussion leader, Paul Cook); Group Three: Responsibility of Dental Profession, City or County Government, School System and Lay Committee (discussion leader, J. Melville Smith), and Group Four: Experimental or Demonstration Projects (discussion leader, Thomas L. Hagan).

On the third day the conclusions and recommendations adopted by the various groups were presented to the general assembly at which time they were approved, amended or rejected.

Proceedings

Leo J. Schoeny, chairman, Council on Dental Health, Louisiana State Dental Society, presided at the general assemblies during the conference.

In opening the meeting, Dr. Schoeny explained that the Dental Health Institute (consisting primarily of lay committees) held in May 1946 in New Orleans was partially responsible for planning of the workshop in that it focused attention on the need for Louisiana dentists to become familiar with the dental health problems and community dental health planning procedures.

W. M. Nicaud, president, Louisiana State Dental Society, extended official greetings.

In stating the objectives of the workshop, Allen O. Gruebbel, executive secretary, Council on Dental Health, American Dental Association, referred to the current series of workshops in dental health planning as marking a new era in dentistry. He cited the primary objectives of the dental profession as (1) to develop improved standards in dental health service and (2) to make that improved health service available to ever increasing groups of the population. He stated that "although the dental profession has made remarkable progress in dental science and methods of treatment, the profession has not previously given the same amount of attention to methods for making dental care more widely available. Thus, the workshop program represents a new era, in that serious attention is also being given to the second objective of the dental profession."

Basic and Factual Information

"Present Status of Preventive Procedures" by Alton K. Fisher, assistant professor of pathology, School of Dentistry, Loyola University, New Orleans. Abstract: Investigations were reviewed relative to dental caries and its prevention during the past decade. Results of preventive methods utilizing dietary regulations, vitamin therapy, silver nitrate impregnations and the topical and systemic administration of fluorides were summarized. Conclusion: There is as yet no proved method of caries prevention but there are promising procedures which are still in the experimental stage.

"Dental Needs of the Nation" by James S. Gray, A.B., M.S., D.D.S., Shreveport, La. Abstract: The principal studies of dental health needs in the United States were reviewed. It was found that additional information is needed to determine a more accurate picture of the dental health status of the nation. In general, caries was cited as being the most prevalent dental disease in children and secondary to pyorrhea in adults. It was concluded, therefore, that,

in order to reduce dental ills to a minimum, caries and pyorrhea must be prevented or at least controlled.

"Louisiana's Dental Needs and Status of Care" by Thomas L. Hagan, D.D.S., M.P.H., Senior Dental Surgeon, U. S. Public Health Service, New Orleans. Abstract: The presentation of the needs and status of dental care was based on caries experience and its sequelae in school age children. The variations in the prevalence of dental caries were shown for six broad areas of the state. Tooth mortality rates followed the caries attack rates in these areas. Children with fillings in permanent teeth were shown to lose teeth at about two-thirds the rate of children without such fillings. In the areas with a low caries rate mild endemic fluorosis was observed in some children. Although in general the younger age group shows a moderate caries attack rate on a state-wide basis, high caries experience rates exist in certain sections. These high rates pose a corrective problem of significantly greater magnitude than would be expected on the basis of the state average.

"Dental Man Power of the Nation and State" by Thomas D. Speidel, M.S., D.D.S., dean, School of Dentistry, Loyola University, New Orleans. Abstract: Available facts and pertinent opinions concerning dental man power in the United States and in Louisiana were presented under four headings: (1) the number of dentists, (2) the distribution of dentists, (3) the relation between variation in distribution of dentists and variation in dental needs and (4) the extent to which our dental man power meets the dental problem.

"The Ability To Pay for Dental Services" by Roy L. Hyde, Ph.D., head of Department of Social Science, Southeastern Louisiana College, Hammond, La. Abstract: Various factors were presented which influenced the demand for dental care, with ability to pay treated as one of those factors. The difference between Louisiana and the nation and between rural and urban areas was emphasized.

"The Louisiana Dental Health Program" by Paul Cook, A.B., D.D.S., M.P.H., chief, Dental Health Section, Louisiana State Board of Health, New Orleans. Abstract: The paper outlined the aims and objectives of the Louisiana State Board of Health to make available more dental health services by (1) promoting improved community health programs and (2) assisting schools to provide a better health, physical education, safety and recreational program. Methods employed to achieve the objectives were given as (1) aiding in the organization of school and community health councils and assisting these councils in solving the problems of dentistry for children, (2) offering refresher courses to dentists in selected communities, (3) making pathology laboratory facilities available to dentists of the state and (4) sponsoring clinics in some communities for groups of children either in health units or in schools.

Panel on Proposed Solutions

The following topics were discussed in the panel on proposed solutions: "Compulsory Health Insurance" by M. F. Jarrell, D.D.S.; "Voluntary Prepayment Plans" by William C. Epstein, D.D.S.; "Postpayment Plans" by J. Roy Bass, A.B., D.D.S.; "Children's Bureau Bill" by Wynn R. Irvine, D.D.S.; "The Taft Proposal" by Norman J. Folse, D.D.S., and "The A.D.A. Program" by Earl J. Breaux, Jr., D.D.S.

The concluding remarks were made by Allen O. Gruebbel. Abstract: The results of this workshop may be measured by the constructive attitudes displayed by the participants, by the amount of information which was presented factually and objectively, by the intelligent and unemotional discussion of the knotty questions and by the far-reaching recommendations agreed upon

unanimously. Evaluation of the final conclusions must come from the testing of the recommendations through actual experience. The important thing now is to take immediate steps to put all of the recommendations into effect as soon as possible.

"Significance of the Workshop" by J. W. Brouillette. Abstract: The workshop was significant because it revealed (1) the unity of the dentists' efforts as a professional group, (2) the close working relations of the state dental society and the American Dental Association, (3) the dentists' recognition of their responsibilities to the public, (4) the dental profession's interest in uniting its efforts with those of other groups to promote a better type of education through a more comprehensive health program, (5) the desire to relate dentistry's scientific researches and findings to the general health problems of the state and nation and (6) the emphasis which was placed on a program of greater service to the people with further emphasis on the need for greater dental service to the children of the state.

Recommendations

The workshop resulted in the adoption of sixty-seven recommendations. All of these proposals have been officially adopted by the Louisiana State Dental Society to serve as a basis for future dental health planning in Louisiana.

For the purpose of clarity, they are grouped in condensed form under three major objectives.

A. In order to increase the public appreciation of and demand for dental services, it is recommended:

1. That an educational program be developed to increase the public appreciation of dental services and to keep the public continually aware of its dental needs and of measures to meet these needs.

2. That organized dentistry assume leadership and participate actively in all dental health programs.

3. That the interest and active participation of lay groups be sought in the planning and the operation of all dental health programs.

4. That members of the state council on dental health participate in the interdepartmental workshops conducted by state agencies.

5. That continuous effort be made to organize parish and community dental health councils to cooperate with community agencies.

6. That the dental profession request the American Dental Association to make available dental health educational teaching material more adaptable for teaching purposes.

7. That teachers be informed adequately on dental health subjects by the provision of up-to-date textbooks, visual aids and other materials.

8. That proper learning facilities be placed at the disposal of teachers and children.

9. That local councils on dental health sponsor study groups among dentists to standardize technics for instructing teachers.

10. That school authorities organize activities to make the most of all dental health teaching situations, such as physical and dental examinations, health records and school lunchrooms.

11. That the major portion of the dental health educational program be directed at preschool and grammar school children.

12. That dental health education material be developed for the several grade levels in schools.

13. That local councils on dental health acquire, or at least have made available to them, a review of all health educational material used in their communities.

14. That the state council on dental health confer with the educators who will conduct a workshop on the develop-

ment of audio-visual aids in teaching health principles.

15. That a person be employed on a full-time basis by the state dental society to help carry out the functions of the state council on dental health.

16. That the personnel of the dental health section of the state board of health be increased.

17. That various types of demonstration projects be established in different sections of the state to determine the effectiveness of dental health education, and that the success of these programs be evaluated at two year intervals.

B. In order to increase dental personnel and to improve their training, it is recommended:

1. That suitable action be taken to increase dental personnel to meet the demand for dentistry and to maintain a 1 to 1,000 ratio of dentists to population.

2. That dentistry be included in vocational guidance, particularly for those students showing an interest in dentistry as a career.

3. That vocational guidance activities be directed to youth living in rural areas.

4. That economic and social facts be determined about communities that need dentists and that this information be placed before dental students in an effort to attract dentists to such localities.

5. That state scholarships for dental students with high intellectual qualifications be established (a modification of the Alabama plan).

6. That the present dental schools be expanded and strengthened.

7. That the possibility of federal assistance to schools and students in the health professions be explored.

8. That courses in rural sociology or social problems be made a prerequisite to dental education.

9. That senior dental students be assigned for a period to those communities in which good health programs exist.

10. That dentists, after comprehensive training in dentistry for children, conduct short refresher courses for their colleagues.

11. That local councils on dental health use existing facilities and available materials to study (1) growth and development of children, (2) social and emotional adjustment of children and (3) methods of coordinating the activities of official and nonofficial agencies who are interested in the field of health.

12. That the Council on Dental Health of the Louisiana State Dental Society take the responsibility of continuously educating the dentists in the objectives and proposed plans of the society through state, district, parish and local councils and committees and by other means at its disposal.

13. That standards for training ancillary aids be established by the Council on Dental Education of the American Dental Association.

C. In order to develop and assist programs designed to bring dental services to more persons, it is recommended:

1. That dental health programs include all children without respect to their ability to pay.

2. That the state council on dental health make school authorities aware of the need for dental equipment in schools.

3. That schools be made an integral part of all dental health planning and that school authorities be made aware of how they can assist in promoting better dental health.

4. That health centers be established with dentistry as an integral part.

5. That suitable steps be taken to expand the dental departments of the state charity hospitals.

6. That the prepayment principle be studied with the view of establishing a prepayment dental care plan for children.

7. That research findings be utilized to conduct demonstrations of their usefulness on a public health basis.

8. That dentists allocate particular

days for care of children, the children being transported to dental offices in sufficient numbers to warrant such allocation of time.

9. That school authorities grant excuses from school on the basis of a dentist's appointment card.

10. That each community assume its responsibility for establishing eligibility standards for the admission of children in clinics for free service.

11. That city, county or parish governments be approached for financial aid to support dental health programs.

12. That mobile units, the establishment of internships by the State Department of Health and a plan for honorarium payments to private practitioners be employed for rendering dental service to a selected group of children.

COUNCIL ON DENTAL EDUCATION

TRAINEES IN MECHANICAL DENTISTRY

THE Council on Dental Education has been endeavoring for several months to discover the number of students engaged in the study of mechanical dentistry, both in schools organized for the training of dental laboratory technicians and in dental laboratories under the apprenticeship system. The Veterans Administration has been unable to furnish this information. Therefore the Council has sought the information with relation to schools from state educational agencies and from the schools themselves, and with relation to laboratories from the Dental Laboratories Institute of America. It is believed that the data here presented are approximately correct as of July 1, 1947. Some of the schools were strangely reluctant to report their enrollment and one school refused flatly to do so.

Thirty-eight states and the District of Columbia report no proprietary or public vocational schools for the training of dental laboratory technicians. Eleven states report 19 proprietary schools approved for this training under Public Law 346 and Public Law 16 with an enrollment of 2,391 as shown in Table 1.

There is no uniform pattern of admission requirements or of length and content of the curriculum in these proprietary schools. The admission requirements vary from nothing to the completion of a high school course or the equivalent. The length of the course varies from a few weeks to two years. Some of the schools issue elaborate outlines of the subjects to be taught and others are content with brief generalizations. The publication of this list does not carry any approval by the American Dental Association. The conference recently conducted by the Prosthetic Dental Service Committee went on record as strongly opposing the multiplication of proprietary schools for the training of dental laboratory technicians and as favoring such training under the auspices of an accredited dental school.

Nonproprietary Schools

The list of nonproprietary schools engaged in the training of dental laboratory technicians is yet small. Reports received indicate a much less territorial

coverage than in the case of the proprietary schools as shown in Table 2.

The conference conducted by the Prosthetic Dental Service Committee did

Table 1.—Proprietary schools approved by state departments of education for training dental laboratory technicians

State	School	Enrollment
Colorado	Cross Prosthetic School 1112 East Evans Avenue, Denver 10	16
Connecticut	Gardiner School of Prosthetic Dentistry 439 East Main Street, Bridgeport 8	11
Indiana	Elkhart Business University 117½ West Lexington Ave., Elkhart	55
Louisiana	Southern School of Mechanical Dentistry 1420 Canal Street, New Orleans	75
Massachusetts	Boston School of Mechanical Dentistry 121 Bay State Road, Boston	49
	Chester School of Dental Laboratory Technology 93 Massachusetts Ave., Boston	102
	Leyton School of Dental Laboratory Technology 3 Hancock Street, Boston	120
New Jersey	Newark School of Mechanical Dentistry 127 Mulberry Street, Newark	30
	Acme School for Dental Technicians 17-19 William Street, Newark	82
	Professional Aides Institute 1005 Broad Street, Newark	304
	New York School of Mechanical Dentistry Linden and Washington Streets, Newark	35
New York	New York School of Mechanical Dentistry 125 West 31st Street, New York 1	385
	Kerpel School of Dental Technology 127 Columbus Ave., New York 23	542
	Manhattan School of Dental Technology 166 West 75th Street, New York	218
Ohio	Co-Ed Dental Laboratory School 39 East Market Street, Akron	37
Pennsylvania	McCarrie School of Mechanical Dentistry 207 North Broad Street, Philadelphia	120
	Kerpel School of Dental Technology 301-9 South Broad Street, Philadelphia	61
Texas	Institute of Dental Technology 1025 Esperson Building, Houston	24
Virginia	School of Virginia Prosthetics and Research Lab., Inc. 108 S. Columbus Street, Alexandria	125
Total.....	.....	2,391

not favor the attempt to train dental laboratory technicians in vocational high schools but expressed the hope that the Council on Dental Education might canvass the possibility of giving recognition to vocational schools established by responsible agencies on a nonprofit basis above the high school level. The College of Dentistry of Ohio State University will inaugurate a course in dental technology in September 1947. The Extension Division of the University of California will also inaugurate such a course at Los Angeles.

It appears from the data which have been secured from all sources that there are 2,635 students enrolled in schools, 2,391 in nineteen proprietary schools and 244 in four nonproprietary schools.

Trainees in Laboratories

The Dental Laboratories Institute of America reports the number of laboratories, the number of technical workers in the laboratories including the trainees, and the number of trainees enrolled in organized courses of study as shown in Table 3.

Oversupply of Trainees

It is seen that 7,607 students are in training, 2,635 in schools and 4,972 in laboratories, of whom 4,170 are enrolled under Public Law 346 and 802 under Public Law 16. It is hardly to be expected that all of these students will persist in their studies to the point of qualifying for permanent full-time employment in this field. If it is estimated that at least 15 per cent of the students in schools will drop out, this would mean that about 2,240 would complete the course. Assuming a two-year course, this would mean about 1,120 graduates each year. On the same basis, it may be expected that at least 15 per cent will drop out of the apprenticeship program. This would leave 4,227 to finish their apprenticeships. Assuming a five-year period of apprenticeship, this would mean that about 845 would complete their apprenticeship each year. Roughly, this would mean an output of 1,965 technicians who would be seeking employment on a permanent basis each year.

It is estimated that there are about 3,500 technicians employed by dentists outside of the commercial laboratories. According to the figures compiled by the Dental Laboratories Institute of America, there are 14,286 permanent technical workers in the laboratories. These two groups make up an estimated total of technical workers of 17,786, exclusive of trainees. Assuming that the loss by death and retirement is 24 per thousand, as generally found in dentistry, the number needed for replacement each year would be 426. With an anticipated an-

Table 2.—Nonproprietary schools approved by state departments of education for training dental laboratory technicians

State	School	Enrollment
Tennessee	School of Dentistry, Meharry Medical College Nashville	24
New York	New York State Institute of Applied Arts and Science Brooklyn	70
	Central Commercial High School 214 West 42nd Street, New York	100
	Brooklyn High School for Specialty Trades President St. and Classon Ave., Brooklyn	50
Total		244

Table 3.—Technical workers and trainees in dental laboratories

State	Laboratories	Technical workers, including trainees	Trainees under PL 346	Trainees under PL 16
Alabama	50	25	7	2
Arizona	17	18	6	...
Arkansas	22	49	17	...
California	696	905	108	43
Colorado	37	165	36	2
Connecticut	75	300	80	2
District of Columbia	25	180	18	6
Delaware	2	2	...	...
Florida	67	149	37	1
Georgia	38	53	17	1
Idaho	10	18	7	...
Illinois	295	1,526	144	93
Indiana	69	126	16	3
Iowa	42	92	22	4
Kansas	25	107	32	4
Kentucky	46	198	6	...
Louisiana	39	193	29	4
Maine	22	64	4	3
Maryland	35	210	24	8
Massachusetts	195	875	127	14
Michigan	195	427	37	12
Minnesota	99	883	38	14
Mississippi	20	39	4	4
Missouri	120	285	42	6
Montana	24	39	10	1
Nebraska	35	105	21	8
Nevada	4	14	3	1
New Hampshire	25	82	9	4
New Jersey	261	993	462	33
New Mexico	5	13	3	...
New York	1,280	6,382	2,186	389
North Carolina	61	122	33	2
North Dakota	11	69	12	3
Ohio	307	1,847	143	63
Oklahoma	56	83	21	2
Oregon	48	162	46	7
Pennsylvania	286	832	97	11
Rhode Island	33	127	18	4
South Carolina	11	44	1	1
South Dakota	8	46	11	2
Tennessee	45	171	27	9
Texas	96	362	34	1
Utah	15	48	9	1
Vermont	6	18	4	2
Virginia	38	198	31	4
Washington	71	183	33	13
West Virginia	21	85	7	3
Wisconsin	82	327	87	11
Wyoming	7	17	4	1
Totals	5,077	19,258	4,170	802

nual output, based on present enrollment of 1,965, it readily can be seen that the supply will exceed the demand by far. Under the circumstances, the multiplication of proprietary schools should be discouraged and veterans should be advised of the possibility of an oversupply of dental laboratory technicians.

ANTICIPATED ENROLLMENT OF FRESHMEN IN 1947

THE Council on Dental Education takes its annual inventory of all undergraduate students in dentistry as of October 15 each year. The anticipated enrollment of freshmen in the opening classes in September and October is 3,022 as compared with 2,974 in 1946. This represents closely the maximum capacity of the schools. Once four entering classes are enrolled in the proportions of the entering classes in 1946 and 1947, the schools will find all their facilities taxed to the limit. It is well known that many applicants this year have been unable to find places. Since many candidates file applications with several schools, the total number of individuals who sought and failed to gain admission will not be known until a canvass of all applications to all schools can be made. The anticipated enrollment of freshmen by schools stands as follows:

Estimated freshman dental student enrollment for 1947

School	Enrollment	School	Enrollment
College of Physicians and Surgeons	54	St. Louis University	75
University of California	72	Washington University	52
University of Southern California	125	Creighton University	42
Georgetown University	90	University of Nebraska	35
Howard University	51	New York University	144
Emory University	96	University of Buffalo	67
Loyola University, Chicago	90	Columbia University	33
Northwestern University	110	Ohio State University	75
University of Illinois	70	Western Reserve University	64
Indiana University	90	University of Oregon	75
Iowa State University	55	Temple University	125
University of Louisville	65	University of Pennsylvania	140
Loyola University, New Orleans	50	University of Pittsburgh	96
University of Maryland	110	Meharry Medical College	35
Tufts College	96	University of Tennessee	35
Harvard University	15	Baylor University	72
University of Detroit	60	University of Texas	60
University of Michigan	90	Medical College of Virginia	48
University of Minnesota	100	Marquette University	112
University of Kansas City	100	University of Washington	48
Total			3,022

TESTIMONY ON THE NAVY PROMOTION BILL, H.R. 2537

THE Navy Promotion Bill, H.R. 2537, was designed by the Navy Department to enact a new plan to distribute the officers among the various ranks according to a percentage of the total strength of each corps and to promote officers who are recommended by selection boards.

As introduced the bill gave dental officers equal rights and opportunities as commissioned officers from the rank of lieutenant junior grade to that of captain. Above the rank of captain, however, it would have limited the Navy Dental Corps to one flag rank officer regardless of the strength of the corps, whereas several other staff corps were to be given flag rank officers on a percentage basis. This provision would have restricted severely the opportunity of every naval dental officer to attain flag rank.

At the hearings on the bill the American Dental Association vigorously protested that this discrimination against the Navy Dental Corps was unfair, and the House Armed Services Committee later removed it by amendment. The statement prepared by the Committee on Legislation, regarding the attitude of the American Dental Association toward the bill, was presented at the hearings by Dr. Henry A. Swanson and was reported in the July 1 issue of THE JOURNAL on page 78. Dr. C. Raymond Wells of Brooklyn, a reserve officer in the Navy Dental Corps and a past president of the American Dental Association, explained the need for an increase in the number of flag rank officers in the Navy Dental Corps.

The oral testimony given by Drs. Swanson and Wells at the hearings is as follows:

Mr. Short.—Are there any questions from members of the committee?

Mr. Kilday.—Under the present distribution, how many flag ranks would your proposal authorize?

Dr. Swanson.—About six.

Mr. Kilday.—I see. The bill calls for one?

Dr. Swanson.—One.

Mr. Short.—Doctor, you are not asking for any special consideration, you simply want equality of opportunity on a percentage basis?

Dr. Swanson.—That is right; parity with the other corps or the other branches of the Navy.

Mr. Short.—I wonder if Commander Martineau would like to say anything on that.

Mr. Kilday.—Mr. Chairman, my recollection is that an earlier statement was made to the effect that the Dental Corps was limited to one by the Bureau of the Budget.

Mr. Short.—That is correct.

Mr. Kilday.—I would like to have the Commander comment on that, so far as he can, and also on the question of rank being commensurate with responsibilities of command.

Commander Martineau.—As was brought out previously in the hearings, Mr. Chairman, the Navy bill as submitted to the Bureau of the Budget provided for a maximum of two flag officers in the Dental Corps. The Bureau of the Budget directed that in submitting this bill to the Congress the number of flag officers in the Dental Corps be reduced to one.

The Chairman.—Doctor, how would your percentage reflect itself in flag rank?

Dr. Swanson.—One-half of 1 percent of the strength of the corps.

The Chairman.—What would it be today in flag rank?

Dr. Swanson.—Six.

The Chairman.—As against two recommended

to the Budget and one permitted by the Budget?

Dr. Swanson.—That is right.

Mr. Short.—I understand there is one authorized for the dental corps and 11 for the medical corps in the Army bill.

Commander Martineau.—The flag officers of the Dental Corps are provided under the Navy bill to be one-half of 1 percent of the size of the Medical Corps and that would amount under the estimated fiscal 1948 strength to 20 flag officers in the Medical Corps.

The Chairman.—Doctor, where would your billets be for your six flag officers in the Dental Corps?

Dr. Swanson.—I am not prepared to answer definitely at this time on the specific billets.

The Chairman.—Why do you recommend those figures?

Dr. Swanson.—I will ask a past president of the American Dental Association who served in the Navy during the war to answer that question—Dr. Raymond Wells.

Mr. Short.—Doctor, we thank you very much for your statement. We will listen to Dr. C. Raymond Wells at this time—past president of the American Dental Association.

Statement of Dr. C. Raymond Wells, Past President, American Dental Association

Dr. Wells.—Mr. Chairman and members of the committee, I am C. Raymond Wells, a practicing dentist in Brooklyn, N. Y., and past president of the American Dental Association—in 1944. I served 4½ years on active duty in the Dental Corps of the Naval Reserve during World War II, having been separated in November—November 20, 1945.

As a civil dentist now, and one intensely interested in the armed forces, and, of course, in the dental health of the naval personnel, and in the dental profession, I was amazed to find that Public Laws 284 and 807, which we worked so hard on, and which our naval affairs committee worked on, and which the Congress passed—I was amazed to find they had resulted in the present situation. It was thought by those members of the civil dental profession who were active in the work that in obtaining that privilege from Congress, and the people, we certainly would be on a parity with every other corps in the Navy, that there would be no discrimination between brother officers.

I served in the Navy in 1918. From 1919 to 1925, I was in the regular Naval Dental Corps. As a matter of interest, I resigned, and one of the chief reasons was that a dental officer could only go up to and including the rank of lieutenant commander. There was no provision in law otherwise. I was ambitious and interested in my profession, and I served well, but I said "I think I will hit civilian life, where achievement is, perhaps, possible." However, in 1926 the equalization bill came along, so that if I had stayed in one more year perhaps I would have had a commission as captain. However, they were good enough to make me captain in World War II.

What I am placing before the committee is the viewpoint of achievement which I, as a civilian, have the privilege of attaining in my city of New York.

The Chairman.—May I ask you, Doctor, where would you put six flag officers?

Dr. Wells.—I would be delighted to answer the question. In the first place, you have one in the Bureau of Medicine and Surgery, who would be chief of the Medical Division, operating under the Surgeon General. Secondly, an over-all chief medical inspector in the Bureau of Medicine and Surgery, with special skill, equipment, and so forth.

The Chairman.—Why should he be the same rank as your chief?

Dr. Wells.—As chief? I will tell you that reason. He is, further, going to have dental inspectors in each naval district in the United States. He is going to have to deal with procurement officers in the Navy—flag officers of other corps, the Supply Corps, Bureau of Naval Personnel. He is going to have the same rank as the Medical Inspector, who is a rear admiral, in the Bureau of Medicine and Surgery. The medical inspector probably would always be senior to him—because that is the way we operate, although we won't say anything about the fairness of that. However, that is the way they operate. In your large naval district, for instance New York, you would have the rank of rear admiral there. The medical officer there is a rear admiral. You would have, possibly, a district dental officer, who would be a rear admiral, there. Certainly the inspector would be a rear admiral. You have a rear admiral in the Medical Department, the supply depot, in Brooklyn. You have a rear admiral junior to him there

—in the procurement of these units and these vicious drills and burs that you gentlemen hear about. We need them out in Oakland, Calif. We would create, between the dental inspector and the district dental officers, and within the Bureau of Medicine and Surgery, six.

The Chairman.—Supposing that the Navy saw fit to reestablish the rank of commodore. Wouldn't you be satisfied with one top rear admiral with five one-star commodores in the Medical Corps underneath? After all, there is one chief, isn't there?

Dr. Wells.—Yes, sir; but if the Medical Corps has 19 rear admirals now——

The Chairman.—The Medical Corps might have more commodores and less two-star men too.

Dr. Wells.—The Medical Corps was very generous. They gave us one commodore during World War II and they put him up in Brooklyn, N. Y., in the supply depot. He helped to take care of the procurement for the Government of supplies—dental supplies for the Army and Navy, coordinating it. This gentleman is now separated out; he is a Reserve officer, connected with the Bureau of Standards, a very smart, competent man in the field of physical property material.

We did have one commodore. We wouldn't be satisfied. Of course, we will take it. If a man is eligible for promotion to commodore, I think he should have it. But, also, if he is eligible to be promoted to rear admiral, and there is a billet for him, as we know there is, we think he should have it. The thing I want to get over, and the reason I am here—and I am not here officially representing the American Dental Association—the reason I am here is because of my deep interest. What I want to get in the record is that Public Law 284, which this committee and some members of it whom I see here created, or helped to create, actually seems to be nullified if the Dental Corps does not have parity in the final setup with the other staff corps of the Navy. That means civil engineering, it means your Medical Department, it means your Supply Corps, and so forth.

I would like to introduce in the record if I may an article which I clipped from the *New York Herald Tribune* yesterday morning, which shows a change in the dental division of the bureau of public health in New York City. For many years up there they have operated in a discriminatory sort of way with the dental group. Dental services have been handled by the division of dental service, a part of the bureau of child hygiene. A division, the commissioner said, operates under a bureau, but a bureau operates directly under the health commissioner. "The creation of a dental bureau under the department of health commissioner is designed to improve the administration of dental activity and to give recognition and authority to dentistry commensurate with other medical bureaus."

I wanted to show you how the largest city in the United States recognizes the need for more efficient dental service in the creation of a bureau operating under the health commissioner, a medical man. So I ask you gentlemen, from the standpoint of efficient dental service, from the standpoint of morale of those officers courageously serving now, to offset any discrimination, and lastly I want to emphasize that Public Laws 284 and 807 of the Seventy-seventh Congress, which you created, should be carried out in the future.

Thank you, and I will answer any questions that may be put to me.

Mr. Short.—Mr. Smith.

Mr. Smith.—No questions.

Mr. Short.—Mr. Johnson.

Mr. Johnson of Texas.—No.

Mr. Short.—Mr. Bates.

Mr. Bates.—No questions.

Mr. Short.—Any questions, Mr. Chairman?

Mr. Andrews.—No.

Mr. Short.—Thank you very much, Doctor. We thank you very much for your statement. We will consider carefully the testimony that you have given us.

CURRENT LITERATURE

Journal of Dental Research
February 1947

Titles marked with an asterisk (*) are reviewed below.

***Experimental Investigation of the Referred Pain of Aerodontalgia.** H. C. Hutchins, Delta, Ohio, and O. E. Reynolds, Navy Department.—3.
***Some Observations on the Clearance of Glucose From the Oral Cavity.** J. F. Volker and D. M. Pinkerton, Boston.—9.
Studies of Changes in pH Produced by Pure Cultures of Oral Micro-Organisms. Robert M. Stephan and Elizabeth S. Hemmens, Chicago.
I. Effects of Varying the Microbic Cell Concentration.—15.
II. Comparison of Different Micro-Organisms and Different Substrates.—25.
III. Some Effects of Mixing Certain Micro-Organisms.—35.
***A Method for the Chemical Measurement of Activity of Caries of the Enamel.** Thomas B. Coolidge, Chicago.—43.
***Carious Lesions in Cotton Rat Molars. I. The Role of Mechanical Factors Studied by the Extraction of Antagonistic Molars.** James H. Shaw, Boston.—47.
***The Illusory Sheath of Neumann in Dentin.** Charles F. Bodecker, Center Moriches, N.Y.—53.
***Chemical Studies in Periodontal Disease. IV. Putrefaction Rate as Index of Periodontal Disease.** M. Berg, D. Y. Burrill and L. S. Fosdick, Chicago.—67.
***Development of Rat Molar Crowns and Jaws.** Edmund Applebaum, New York.—73.
***Chemical Changes in the Dentin Following Ageing and Peripheral Irritation.** Solon A. Ellison and Wesley Halpert, New York.—79.
***A Comparative Study of the Effects of Glycerite of Hydrogen Peroxide and of Hexylresorcinol on the Bacteria of the Normal Mouth.** Ethan Allan Brown and George A. Cruickshank, Boston.—83.

Experimental Investigation of the Referred Pain of Aerodontalgia. H. C. Hutchins and O. E. Reynolds.

Pain sensation was produced at the site of recent dental work in 92.8 per cent of 28 cases (14 human subjects) by mechanical stimulation of the nasal mucosa in the region of the maxillary sinus ostium. This evidence strengthens the hypothesis that pain referred to the teeth from the maxillary sinus involves spatial summation of the excitation of two separate afferent nerves.

Some Observations on the Clearance of Glucose From the Oral Cavity. J. F. Volker and D. M. Pinkerton.

The method of Folin and Malmos has been utilized to study the presence of reducing substance in resting saliva. The average value of salivary reducing substances (calculated as glucose) for a group of 30 persons was approximately 20 mg. per cent. The disappearance of ingested glucose fed in the form of chewing gum, hard candy and chewy candy was determined in a group of 12 persons. The rate of disappearance varied considerably from person to person but in general was most rapid after gum chewing and least rapid after chewing of chewy candy. The maximum concentration of salivary sugar is reached within five minutes, and the return to normal is usually complete after thirty minutes. Concentrations as great as 4,000 mg. per cent have been recorded for certain types of candy.

A Method for the Chemical Measurement of Activity of Caries of the Enamel. Thomas B. Coolidge.

It has been shown possible to measure the rate of caries activity in enamel in accessible regions by microchemical means.

Carious Lesions in Cotton Rat Molars. I. The Role of Mechanical Factors Studied by the Extraction of Antagonistic Molars. James H. Shaw.

The right maxillary molars of 25 weanling cotton rats (Sigmondon hispidus hispidus) were extracted. For a period of fourteen weeks thereafter, these cotton rats were fed a purified ration of high caries-producing properties. The number and extent of the carious lesions in the sulci of the right and left mandibular molars were determined and compared at the end of the experiment.

Previous studies of white rats maintained on coarse particle rations have indicated that, when the maxillary molars were extracted, there was a lower incidence of carious lesions

in those mandibular molars which had had no antagonistic molars. In contrast, the extraction of maxillary molars in the cotton rat had little effect on the initiation and progress of the carious lesions in the sulci of those mandibular molars which had not been subject to the stress of mastication. There was a slightly lower incidence and extent of tooth decay in the sulci of the mandibular molars which had had no opposing molars, but this reduction was in no way comparable to the large reduction observed under similar circumstances in the white rat. These data would seem to indicate that the mechanical factors involved in the process of masticating the purified ration used in studies of the cotton rat were not as great nor as important in the causation of carious lesions as those factors involved in the mastication of the coarse particle diets used in experiments with white rats.

The Illusory Sheath of Neumann in Dentin. Charles F. Bodecker.

Two new technics have thrown light on this controversial problem. The common conception of Neumann's sheath is that dentinal tubules are lined with a highly acid resistant, modified dentin matrix, which can be isolated by macerating dentin with 25 to 50 per cent nitric acid. Others claim that these isolated structures are not linings of tubules but represent dentinal fibers.

With the first technic, a partial incineration-decalcification method, brittle tubes are isolated, apparently substantiating the sheath of Neumann and showing it to be an amazingly resistant structure. The second technic, an overdecalcification of the dentin, shows a partial destruction of the matrix in the region supposedly occupied by the sheath, leaving the dentinal fibers intact. The author concludes that the structures surviving maceration of dentin are tubular; these do not represent Neumann's sheaths but are tubular processes of the odontoblasts. The highly resistant character of the dentinal fibers necessitates research in the physiology of dentin.

The value of consultant articles is again demonstrated by the profitable discussion of five authorities who suggest in their criticism that only the term "fiber," and not "fibril," should be applied to the odontoblastic process. Four consultants, including the author, voted that Neumann's sheath is nonexistent; two were skeptical of the material presented.

Chemical Studies in Periodontal Disease. IV. Putrefaction Rate as Index of Periodontal Disease. M. Berg, D. Y. Burrill and L. S. Fosdick.

The rate of putrefaction as determined by indole and sulfide determinations and by means of formol titrations was measured on the saliva of normal persons and on saliva of persons suffering from periodontal disturbances. The periodontal conditions were determined clinically and by means of roentgenograms independently of the salivary analyses. After the results of clinical and laboratory tests were complete the results were compared. It was found that those persons suffering from periodontal disturbances secreted saliva in which the rate of putrefaction was rather rapid as compared with the rate of putrefaction of the proteins of normal saliva.

Development of Rat Molar Crowns and Jaws. Edmund Applebaum.

Evidence has been presented to indicate that there is no fixed point in development of the teeth and jaws of the rat. In early stages of crown formation there is actually bone resorption, with expansion of tooth crown and follicle deeper into the jaw bone prior to eruption. After completion of the crown there is movement of the tooth outward. The mechanism is similar to that in the human being.

Chemical Changes in the Dentin Following Ageing and Peripheral Irritation. Solon A. Ellison and Wesley Halpert.

It has been noted that, after aging and peripheral irritation, certain changes occur in dentin, manifested by the production of regions which, when viewed in ground section, are relatively opaque compared with the unchanged regions. This change has been variously termed metamorphosis, sclerosis and dead tracts. In the present study an attempt was made to determine if chemical differences existed between the relatively opaque regions and the unchanged regions. These regions will be referred to as Type II dentin and Type I dentin, respectively.

Ground sections were made of 19 teeth. The sections were examined microscopically, and the enamel, cementum, pulp remnants and predentin were removed with burs. The remaining dentin was then separated into the two types of dentin with a No. 536 crosscut fissure bur. An analytic sample represented

all the dentin of each type obtainable from each tooth, thus permitting comparison of Type I and Type II dentin from the same tooth.

The weighed samples were ashed to determine the percentage of inorganic matter. The ash was dissolved and the resulting solution was analyzed to determine the percentage of calcium and phosphorus. It was found that there was a larger percentage of inorganic matter in the Type II dentin as compared with Type I. In the inorganic matter there was a smaller percentage of calcium and of phosphorus in Type II as compared with Type I.

The change appears to be one of deposition of some inorganic substance, the nature of which is not determined. Further work is in progress to determine the nature of the substance.

A Comparative Study of the Effects of Glycerite of Hydrogen Peroxide and of Hexylresorcinol on the Bacteria of the Normal Mouth. Ethan Allan Brown and George A. Cruickshank.

Glycerite of hydrogen peroxide, derived from nonaqueous hydrogen dioxide (92 per cent) or from urea peroxide (4 per cent), in anhydrous glycerol containing 8-hydroxyquinoline (0.1 per cent) as a secondary stabilizing agent, was used as a mouth rinse in ten experiments. Comparisons were made between hydrogen peroxide 0.75 per cent and hexylresorcinol, 1:2,000, with water as an experimental control. The initial count was followed by a five minute rinse, and successive subsampling counts were taken at intervals of ten minutes and one, two and three hours.

The normal saliva, with no meal, no water and no mouth rinse, showed a gradual increase in bacterial population to 450 per cent by three hours. With a water rinse, the three hour total was 336 per cent. With hexylresorcinol solution, the three hour total was 143 per cent. With glycerite of hydrogen peroxide, the three hour count was 72 per cent.

The hydrogen peroxide solution was found to be less irritating and to cause a greater reduction in the number of oral organisms, both initially and over a longer period of time, than the other solution studied.

Trauma in Malignant Tumors of Bone. B. L. Coley. Am. J. Surg. 73:300, February 1947.

It is the opinion of the author that the role of a single injury in the development of bone sarcoma has been overemphasized. The author also claims that little support of the traumatic theory has been afforded by the pathologist; no laboratory experience seems to favor it.

Certain cases of osteochondroma or chondromyxoma have been studied in which injury has seemed to initiate a change in the type of tumor to the corresponding malignant type. In such cases, as a preventive measure, the author recommends removal of these tumors when they occur in a location which renders them liable to external injury.—*Hyman Goldberg.*

Do Certain Drinking Waters Favor Dental Caries? H. Klein. Science 105:4, January 3, 1947.

Several findings suggest that, just as there are factors in drinking water which favor resistance to tooth decay, there may be factors in drinking water which make the teeth more vulnerable to dental caries. Search for the principles in the nonfluoride waters responsible for the described effects is now actively under way. Superficial examination indicates that the nonfluoride waters in this area (this study was made in five communities of southern New Jersey) are acid enough to require treatment with alkali, and they contain excess iron to such an extent that aeration is required to remove it. Preliminary chemical analysis indicates an unusually high content of nitrates, constituting more than half of the fixed residue. —*Hyman Goldberg.*

Convulsions Occurring During Anesthesia. H. T. Wikle and R. J. Ryan. Am. J. Surg. 73:83, January 1947.

Convulsions during anesthesia are rather uncommon, but it is important for physicians and dentists to be on the alert to treat these unfortunate occurrences and prevent them if possible. The cause of these convulsions is extremely vague, reports ranging from the sublime to the ridiculous. Despite lack of knowledge concerning the causative agents, strict attention to the preoperative care of patients, particularly those who are acutely ill and toxic, may very well lessen the number of convulsions during anesthesia. Lundy, of the Mayo Clinic, and also the authors recommend the prompt intravenous administration of thiopental (Pentothal) sodium, the use of which should reduce greatly the number of convulsions and resulting mortalities.—*Hyman Goldberg.*

The Preservation of Deciduous Molars. J. H. Glen. D. Record 67:19, January 1947.

The theory advanced of the physiologic cycle of life and the progressive loss of virility of the deciduous dentition would appear to account both for the phenomenon of the rapidity of decay in these teeth after six years and for the subsequent failure of the most carefully executed restorations. Therefore, much time can be wasted in attempting to elaborate conservative treatment. It is suggested by the author that the possibility of removing the temporary first molars as a means of retaining the services of the temporary second molars as space maintainers should be considered more often. The extraction of this tooth (temporary first molar) not only allows an easy access to the cavity in the temporary second molar when conservation is possible but also creates a large self-cleansing region which in itself often proves to be sufficient to preserve the tooth without further treatment. Data is presented proving that the difference in measurements, owing to the forward movement of the permanent first molar, was as an average little more than that which may occur during the assumption of normal occlusion, and it could not be expected that the eruption of the bicuspids would be impeded if this method was clinically adopted. —*Hyman Goldberg.*

Effect of Fluorine on Iron Metabolism. E. V. Pindborg, J. J. Pindborg and C. M. Plum. Acta pharmacol. et toxicol. 2:294, 1946.

Six white rats were placed on stock diet to which had been added 0.1 or 0.05 per cent fluorine as sodium fluoride to the diet. Three animals were placed on the same regimen plus increased iron intakes. Suitable control animals were used. Iron determinations were made on the incisor teeth, the excreta and the liver, and the hematologic changes were observed. Observations indicate that the depigmentation of the teeth in fluorine poisoning is accompanied by a decrease in iron content. The iron content of the liver decreases during fluorine poisoning. A definite reduction in hemoglobin and in erythrocytes was observed. Excretion of iron in the feces was increased and could be first observed a few days after fluorine administration had begun. Addition of iron to the food after poisoning increased the rate of restoration of the iron depots of the organism. —*J. E. Gilda.*

Services and Visits in a Children's Dental Clinic. I. Altmann. Pub. Health Rep. 62:113, January 24, 1947.

An analysis was made of the dental records of 1,169 children who came to a Central City Clinic of the Philadelphia Mouth Hygiene Association for the first time in 1942 or 1943. The association provides dental care at low cost for children whose families cannot afford private treatment. Fifty-four per cent of these children completed the initial series of treatments; for white children the percentage was 58 and for Negro children it was 44. Of the entire group, 12 per cent were up to date in treatment. Younger children showed a greater tendency to continue treatment. Children who failed to complete the initial series of treatments had considerably more need than those who completed this series.

Services indicated per child for routine treatments on first recall (begun seven months after completion of the initial series) were fillings, 0.6 deciduous teeth and 2.4 permanent teeth; extractions, 0.4 deciduous teeth and 0.1 permanent teeth. Children who responded to the first recall apparently did not differ in caries susceptibility from those who did not respond. Services indicated on second recall were slightly less than those on the first. The average number of visits per service in this clinic were: prophylaxis, 1.03; filling of deciduous tooth, 0.98; filling of permanent tooth, 1.16; extraction of deciduous tooth, 0.77, and extraction of permanent tooth, 0.98. In the group of 1,169 children, 30 received orthodontic treatment, 21 were provided with prosthetic devices and 18 had root-canal therapy.—*J. E. Gilda.*

Cadmium Poisoning and Iron Metabolism. E. V. Pindborg, J. J. Pindborg and C. M. Plum. Acta pharmacol. et toxicol. 2:302, 1946.

A series of 25 rats was maintained on a diet to which 0.0025 per cent cadmium had been added. The animals tolerated the cadmium poorly and after five to seven weeks most of them were moribund. The number of days the animals were on the regimen ranged from twelve to one hundred fifteen. Color and iron content of the incisors, hemoglobin and certain hematologic determinations were carried out. A depigmentation of the incisors which was associated with a decrease in their iron content was observed. An anemia developed together with a pronounced reticulosis.—*J. E. Gilda.*

DEATHS

Maggard, G. G., Burning Springs, Ky.; School of Dentistry, University of Louisville, 1905; died May 25; aged 67.

Mann, A. E., Findlay, Ohio; died May 17; aged 72.

Marlatt, Hector G., Buffalo; School of Dentistry, University of Buffalo, 1902; died May 24; aged 71.

Mayhall, Robert C., Edinburg, Ind.; School of Dentistry, Indiana University, 1898; died June 15; aged 69.

Melvin, Merton R., Edina, Minn.; College of Dentistry, University of Minnesota, 1906; died June 20; aged 66.

Miller, Theodore, Platteville, Wis.; Dental School, Northwestern University, 1907; died June 1; aged 66.

Million, Robert E., Louisville, Ky.; died May 23; aged 64.

Mioducki, Leonard H., Buffalo; School of Dentistry, University of Buffalo, 1921; died May 29; aged 48.

O'Donnell, Cornelius J., Price Hill, Ky.; Ohio College of Dental Surgery, Dental Department of the University of Cincinnati, 1919; died June 12; aged 52.

Owen, Joseph H., Helena, Mont.; died June 10; aged 70.

Palitz, Albert, New York; Thomas W. Evans Museum and Dental Institute School of Dentistry, University of Pennsylvania, 1906; died June 18; aged 67.

Pearce, Waldo R., Silver Spring, Md.; died May 24; aged 64.

Powers, Daniel M., Oil City, Pa.; Medico-Chirurgical College of Philadelphia, 1902; died June 12.

Pridgen, Oscar G., Jacksonville, Fla.; died May 28; aged 71.

Prince, Gustave, Astoria, N.Y.; College of Dental and Oral Surgery of New York, 1915; died June 18.

Read, E. L., Oakland, Ill.; School of Dentistry and the Baltimore College of Dental Surgery, University of Maryland, 1902; died May 21; aged 76.

Reese, A. S., Elkton, Ky.; School of Dentistry, University of Louisville, 1902; died June 25; aged 70.

Reinnoldt, Clarence A., Milwaukee; School of Dentistry, Marquette University, 1918; died June 13; aged 48.

Rice, Thomas L., Ames, Iowa; Dental School, Northwestern University, 1905; died June 6; aged 75.

Schantz, Emanuel, Newark, N. J.; died May 26; aged 51.

Schwartz, Harold G., Bridgeport, Conn.; died June 7; aged 43.

Seavey, Webster S., Boonville, N. Y.; Baltimore College of Dental Surgery, 1900; died June 9.

Sheffield, L. Langdon, Toledo, Ohio; Dental School, Northwestern University, 1898; died June 5; aged 75.

Smith, A. Haywood, Nashville, Tenn.; School of Dentistry, Vanderbilt University, 1911; died May 20; aged 62.

Stembel, Basil J., Indianapolis; School of Dentistry, Indiana University, 1901; died June 15; aged 80.

Straughn, William S., Dover, Del.; Medico-Chirurgical College of Philadelphia, 1916; died June 1; aged 57.

Taylor, W. B., Winchester, Ky.; School of Dentistry, University of Louisville, 1910; died May 31; aged 61.

Tennis, P. Clarence, Los Angeles; College of Dentistry, University of Southern California, 1919; died June 5; aged 63.

Thiedeman, William L., Lansing, Mich.; College of Dentistry, Marquette University, 1905; died June 3; aged 63.

Tryon, William M., San Francisco; College of Dentistry, University of California, 1900; died June 9; aged 69.

Turner, Charles R., Raleigh, N.C.; Thomas W. Evans Museum and Dental Institute School of Dentistry, University of Pennsylvania, 1898; died June 11; aged 71.

Whaley, Edwin G., Brooklyn; died June 5; aged 65.

Williams, Carlton M., Topeka, Kan.; died May 16; aged 57.

Winder, Charles J., Eaton Rapids, Mich.; Illinois School of Dentistry, 1900; died May 19; aged 68.

Wood, L. H., Knoxville, Tenn.; School of Dentistry, Vanderbilt University, 1919; died March 22; aged 47.

Woodley, Frank E., Niagara Falls, N.Y.; Thomas W. Evans Museum and Dental Institute School of Dentistry, University of Pennsylvania, 1901; died in March.

Zralik, Frank I., Cleveland; School of Dentistry, Western Reserve University, 1918; died May 5; aged 55.

Zieger, Otto C., Owatonna, Minn.; College of Dentistry, University of Minnesota, 1900; died June 4; aged 69.

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MEETINGS OF STATE SOCIETIES

State	Date	Place	Secretary	Address
Alabama	April 15–17, 1948	Birmingham	G. W. Matthews	1922 Tenth Ave., S., Birmingham 5
Arizona			B. K. Litt	68 E. Congress, Tucson
Arkansas			I. M. Sternberg	Merchants Bank Bldg., Ft. Smith
California			L. E. Linehan	450 Sutter St., San Francisco
S. California	Sept. 15–17	Los Angeles	M. E. Ralston	903 Crenshaw Bldg., Los Angeles 6
Colorado			R. A. Downs	724 Republic Bldg., Denver 2
Connecticut			E. S. Arnold	37 Linnard Rd., W. Hartford
Delaware			J. Krygier	309 S. State St., Dover
D. of Columbia			K. H. Wood	202-1835 Eye St., N.W., Washington
Florida	Nov. 10–12	St. Petersburg	J. I. Todd	433 St. James Bldg., Jacksonville
Georgia	Oct. 19–22	Atlanta	J. M. Heard, Jr.	Persons Bldg., Macon
Hawaii	Oct. 30–Nov. 1	Honolulu	J. H. Dawe	P. O. Box 39, Honolulu 10
Idaho			R. Sutcliff	Twin Falls
Illinois	Oct. 9–11	Peoria	P. W. Clopper	623 Jefferson Bldg., Peoria 2
Indiana			E. E. Ewbank	Kingman
Iowa			A. N. Humiston	417 Higley Bldg., Cedar Rapids
Kansas			F. A. Richmond	1008 Huron Bldg., Kansas City
Kentucky			J. L. Walker	640 Barbee Way, S., Louisville
Louisiana	April 8–10, 1948	Alexandria	J. S. Bernhard	407 Medical Arts Bldg., Shreveport
Maine			A. H. Garcelon	State House, Augusta
Maryland	April 29–30, May 1		J. H. Shackelford	706 Baltimore Life Bldg., Baltimore 1
Massachusetts	May 3–6, 1948	Boston	P. E. Adams	227 Commonwealth Ave. Boston 16
Michigan	April 12–14, 1948	Detroit	F. Wertheimer	Michigan Department of Health, Lansing
Minnesota	Feb. 23–25, 1948	St. Paul	L. M. Cruttenden	Lowry Medical Arts Bldg., St. Paul
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North Carolina	April 26–28, 1948	Asheville	C. W. Sanders	Benson
North Dakota			K. G. Allen	Fargo
Ohio	Nov. 9–12	Cleveland	E. G. Jones	185 E. State St., Columbus
Oklahoma			E. W. Wise	Medical Arts Bldg., Tulsa
Oregon			W. H. Hurley	922 Selling Bldg., Portland 5
Panama Canal Z.			T. W. Cagle	Box 243, Cocoli
Pennsylvania	May 11–13, 1948	Atlantic City, N. J.	E. R. Aston	421 Market St., Kingston
Philippine I.			G. A. Carreon	9 Broadway, Third St., N. Manila
Puerto Rico			R. Miranda	Box 747, Rio Piedras
Rhode Island			S. Ozarin	172 Tames St., Newport
South Carolina			J. R. Owings	201 E. North St., Greenville
South Dakota	May 9–11, 1948	Sioux Falls	E. W. Elmen	Sioux Falls
Tennessee	May 24–27, 1948	Memphis	E. J. Justis	Exchange Bldg., Memphis
Texas	April 12–15, 1948	Fort Worth	W. Ogle	313 Medical Arts Bldg., Dallas
Utah			S. Ballinger	1001 Tribune-Telegram Bldg., Salt Lake City
Vermont			J. A. Larrow	Middlebury
Virginia			J. E. John	804 Medical Arts Bldg., Roanoke
Washington	Jan. 29–31, 1948	Seattle	F. J. Dingler	1502 Medical & Dental Bldg., Seattle 1
West Virginia			C. J. Gavelda	Clarksburg
Wisconsin	March 30–April 1, 1948	Milwaukee	R. A. Mason	964 N. 27th St., Milwaukee
Wyoming			J. D. McNiff	208 Grand Ave., Laramie

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State	Date	Place	Secretary	Address
Indiana	Nov. 3–6		C. A. Frech	Gary National Bank Bldg., Gary
Iowa	Oct. 3–9	Iowa City	H. G. Bolks	923 Baderow Bldg., Sioux City 9
Kentucky	Sept. 22–25	Louisville	R. I. Todd	Western Union Bldg. Richmond
Ohio	Oct. 13–18	Columbus	E. D. Lowry	79 E. State St., Columbus
Wisconsin	Feb. 9–13, 1948	Milwaukee	S. F. Donovan	Tomah

OTHER MEETINGS

Name	Date	City	Secy. or Chm.	Address
American Academy of Applied Nutrition, Twelfth Annual Meeting	Oct. 4-5	Del Mar, Calif.	A. G. James Secy.	409 N. Camden Drive, Beverly Hills, Calif.
American Anti-Arthritis Association	Oct. 4-5	Del Mar, Calif.	R. T. Pottenger Secy.	Monrovia, Calif.
American Board of Oral Surgery	Nov. 7-8*	Chicago	L. M. FitzGerald Secy.	718 Roshek Bldg., Dubuque, Iowa
American Dental Society of Europe	July 27-30, 1948	London	K. C. Campbell Secy.	88 Portland Place, London, W. 1.
American Public Health Association, Seventy-Fifth Annual Meeting	Oct. 6	Atlantic City, N. J.	R. M. Atwater Secy.	1790 Broadway, New York 19
American Society for the Advancement of General Anesthesia in Dentistry	Oct. 27	New York	M. H. Feldman Secy.	730 Fifth Ave., New York
Federacion Odontologica Latino Americana, Fifth Congress	Oct. 3	Buenos Aires	D. M. Cohen Secy.	Calle Junin No. 959, Buenos Aires, Argentina
Annual Seminar for the Study and Practice of Dental Medicine	Oct. 19-24	Yosemite Valley, Calif.	M. G. Lewis Secy.	1618 Ninth Ave., San Francisco 22
Montreal Dental Club Twenty-Third Annual Fall Clinic	Oct. 22-24	Montreal	M. L. Donigan Director	Drummond Medical Bldg., 1414 Drummond St., Montreal 2, Canada
New England Dental Society	Nov. 5–6	Boston	J. F. Barton Secy.	43 Farmington Ave., Hartford 5, Conn.
University of Buffalo, School of Dentistry Alumni Association, Forty-Fifth Annual Meeting	Oct. 14–16	Buffalo	E. L. Ruffing Chm. Publicity	233 W. Ferry St., Buffalo 13
Northeastern Society of Orthodontists	Nov. 10–11	New York	O. Jacobson Secy.	35 W. 81st St., New York
University of Oregon Annual Dental School Alumni Meeting	Sept. 25–27	Portland	R. B. Keller Secy.	Medical-Dental Bldg., Portland, Ore.
Odontological Society of Western Pennsylvania, Sixty-Sixth Annual Meeting	Oct. 28–30	Pittsburgh	W. E. Craig Secy.	Jenkins Bldg., Pittsburgh 22

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The Children's and Infants' Hospital (a Unit) of Boston, Address Paul K. Losch, 300 Longwood Ave., Boston.

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City Memorial Hospital, Winston-Salem, N. C. Superintendent, J. B. Whittington.

Columbia University, School of Dental and Oral Surgery. Associate Dean, Bion R. East, 630 W. 168th St., New York 32.

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